

GARBAGE

THE PRACTICAL JOURNAL FOR THE ENVIRONMENT



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TASTE • QUALITY • NUTRITION

Edensoy makes a splash! Once you've tried this delicious dairy-free soy beverage, you'll understand why it's quickly become America's favorite.

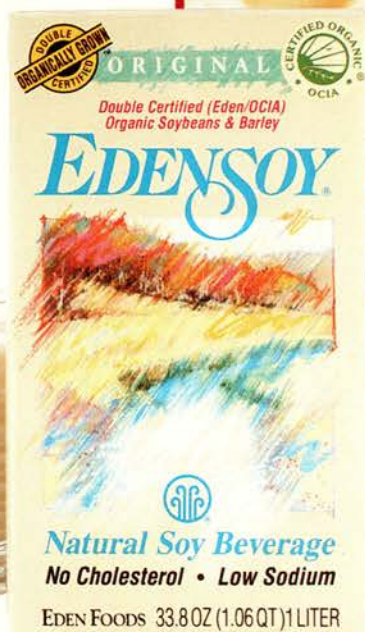
Taste – Discover the smooth, rich, satisfying flavor of Edensoy. Pour it on cereal, hot or cold. Drink it right from the carton, cook with it, and bake with it. You'll love the versatility and convenience of this wholesome food.

Quality – Edensoy Original Organic is Double Certified Organic by both Eden and the Organic Crop Improvement Association (OCIA). That means you can be sure our growing and processing skills maintain the integrity of the ingredients.

Nutrition – High protein, no cholesterol, low sodium, dairy-free and lactose-free, Edensoy can be enjoyed by everyone! It is an excellent source of iron, thiamine, magnesium, copper and phosphorus.

Available in economical liter and individual 250 ml packages. Choose from Vanilla, Carob or Original Organic.

So the next time you want a satisfying, nutritious beverage, look for Edensoy. And pour it on.



We invite you to write to us for detailed information about our products, standards, recipes and our company's commitment to our customers.



Eden Foods, Inc. 701 Tecumseh Road
Clinton, Michigan 49236 OCIA No. 4022 C003-9

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January/February 1992

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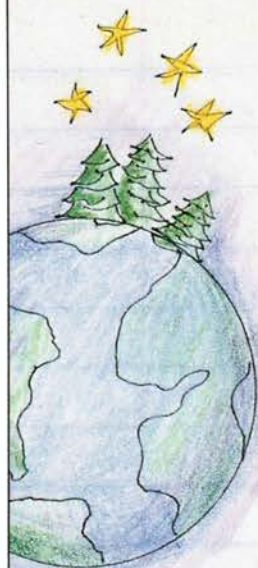
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I
vermi-
composting



Recycle
or Die



COMPOST
HAPPENS



Sitting by the curb, a bag of aluminum looks like a bag of steel or a bag of glass or a bag of plastic. But if you have any trouble telling one from another, just wait until they get to the recycling center and you put them up for sale.

**In 1990,
Dakota County, Minnesota
Earned \$528,347
Selling Its Recyclables.
\$396,938 Came From
Aluminum Cans.**

Take the case of Dakota County, near Minneapolis/St. Paul. In 1990, used aluminum beverage cans earned the county over \$1,100 per ton—many times more than any other recyclable. In fact, of the \$528,347 the Dakota County recycling program brought in during 1990, almost \$400,000 came from one single source—aluminum cans.

Nationwide, aluminum earns recyclers

15 times more than steel, eight times more than plastic and 18 times more than glass.*

Why the huge difference in value? The economics of aluminum.

Unlike most other container materials,

the high cost of it. It takes 95% less energy to produce aluminum from a used can than it does to make aluminum from ore. So it's an understatement to say it's in our best economic interest to recycle as much aluminum as possible.

That's the reason why scrap aluminum commands such a premium price.

And that's exactly why, in one community program after another, aluminum is responsible for such a phenomenally high percentage of the total recycling revenue.

So don't be misled by those bags sitting at the curb. They may look similar, but the economic reality is, they couldn't be more different.

The bag filled with aluminum is worth many times more than a bag filled with anything else.

That's a fact you can take to the bank. Which is precisely what they do in Dakota

County, Minnesota.

To learn more, write Community Recycling,

The Aluminum Association, 900 19th Street, NW, Suite 300, Washington, D.C. 20006.

100% of every aluminum can is recyclable directly into another aluminum can. It's a process called "closed-loop" recycling, and it's recycling in the purest form. We don't need to invent new by-product technologies to make use of the materials we reclaim.

With aluminum, a can becomes a can becomes a can.

Then there's energy, or more accurately,

Aluminum Pays.





So Long Subway

"You publish an environmental magazine in Brooklyn?! Isn't that a contradiction in terms (hah, hah, hah)?"

"You must be happier now that you moved to Gloucester. It's a lot more appropriate, right?"

LIVED IN NEW YORK CITY for 18 years. Past tense. Moved the whole family to Cape Ann, a rock jutting into the Atlantic off the northeast coast of Massachusetts.

Yes, I'm happier. Yes, I'm closer to "nature." But is it more appropriate, or more environmental? Maybe not.

Let me describe my "environmental life" in New York:

1. I lived in a row house with windowless brick party walls on two sides. Thus insulated, the house needed heat only between Halloween and Easter, and, compared to

freestanding structures, it was efficient despite its age.

2. Given the population density (making curbside pickup cost-effective) and the looming presence of Fresh Kills Landfill, my NYC neighborhood had "intensive recycling": weekly pickup of commingled glass, metals, and plastics, plus (more recently) organic waste.

3. I chose to live and work in the same neighborhood. I walked three blocks to work. I also walked to the grocery, the bank, the sitter, etc. etc.

4. Having no daily need for a car, I didn't bother to get a driver's license. So I took the subway when I had to venture into the City (Manhattan).

5. Prospect Park was nearby, but my lot was 22' by 90'. Say what you will about the preponderance of pavement in older cities, but realize that their residents aren't threatening open space.

Now let's look at Gloucester (and most of this suburban country):

1. My rented old house, exposed to wind on four sides, uses as much fossil fuel as the house in Brooklyn with the temperature set 10 degrees lower. And the heating season is two months longer.

2. Recycling is the right thing to do here. But curbside pickup would be prohibitively expensive (both financially and environmentally). So I must separate the recyclables myself, cans have to be de-labelled, washed, and crushed, and we have to drive it all to a drop-off center. Most plastics are not accepted.

3. I still live and work in the same town, but it's an eight-minute drive now.

4. Living 1/2 mile from the bus route (the bus passed once an hour, at least until that nor'easter wiped out the main road), I decided fairly rapidly to get a driver's license. Two days after passing my test, I bought my first car.

5. Although Cape Ann still has more open space than most suburban areas, and development is minimal, there's no question that people take up more room here. There is nothing as space efficient, and therefore environmentally sound, as an old urban center.

So the "obvious truth" that Gloucester is a better home than New York for an environmental magazine isn't so obvious, is it? Not that Gloucester is a bad place for it. It's as good a place as Brooklyn or anywhere in the real world.

Regarding the comments at the top of this page: my rebuttal has been rational and quantitative. I believe, however, that those comments were made intuitively — and I do understand. Intuitively, it is easier to be in sync with the natural world when you hear crashing waves than when you hear screeching sirens. It is easier to care about saving open space when you enjoy it daily, than when it is absent in the immediate surroundings. It is easier to have primitive longings for Earth connection when you see stars in the sky instead of halogen-lit billboards.

And yes, in that way, Gloucester is better for me.

I accept that I'm not necessarily a better citizen for having left New York, however. It's hard to be good. And so complicated, too.

Best wishes for a happy and healthy new year to all.

Patricia Moore
Editor



ROBERT PRINCE

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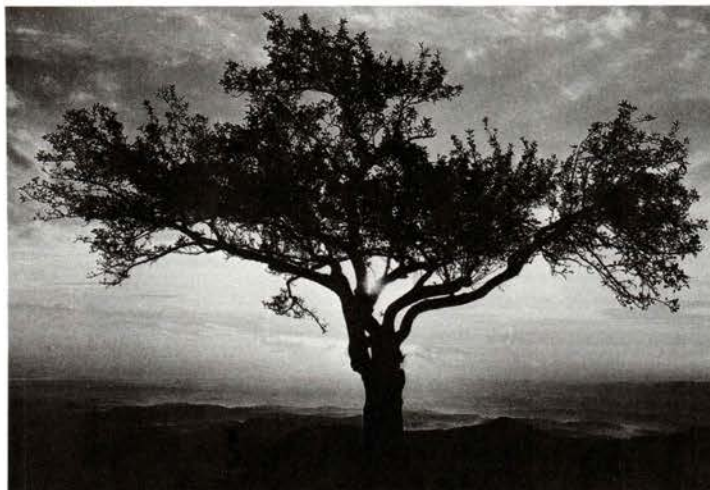
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WE'VE HELPED OVER 600 COMMUNITIES PROTECT THE ENVIRONMENT.



It's a fact. American homes contain dozens of household waste products. A lot of that seemingly harmless stuff we've got lying around the garage, basement and under the kitchen counter is dangerous hazardous waste. It is estimated that the average household contains ten to fifteen gallons of waste materials.

Many concerned community groups and city leaders are actively seeking ways to organize collection programs to prevent household hazardous wastes from finding their way into local sanitary landfills and water resources. That's why more and more communities are calling Laidlaw.

Laidlaw Environmental Services is one of the nation's largest organizations committed to the effective management, transportation and disposal of household hazardous waste. Across the nation, we've helped create responsible

community partnerships to educate people about the dangers of household hazardous waste. We've also organized and participated in hundreds of waste collection programs.

So, if your community is thinking about organizing a household hazardous waste collection program, or if you'd like to know more about how Laidlaw Environmental Services can help, call 1.800.356.8570. Our Manager of Household Hazardous Waste is available to answer all your questions about conducting a waste collection program in your community.

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Greenwashed ... Petro Man ... More McServed ... Solar in the Fast Lane ... Taped Apes ... Kids and the 'S' Word



Into the Terrible Twos

GREEN SPIEL

"Green Police" (Sept/Oct) questions whether anyone can provide reliable information on the environmental impact of consumer products. The answer is that someone must if market forces are to be harnessed for the benefit of the Earth.

Even sophisticated shoppers have no way to independently verify claims of recycled content or CFC-free manufacturing processes. This is what makes green fraud possible.

Greenwashing is *intentionally* confusing, and it leaves consumers distrustful of the claims of good products as well as bad ones. Some bewildered consumers are beginning to disbelieve all environmental

claims. Your article, with its cynical tone, failure to discriminate among certification efforts, and lack of constructive suggestions, can only feed this trend.

The *genuinely* non-profit Green Seal program offers a public standard-setting process [and] the unquestioned integrity and unrivaled technical excellence of the 4,100 professionals at Underwriters Laboratories Inc.

DENIS HAYES
Green Seal
Palo Alto, Calif.

Cross symbol. That certification is documentation Clorox can provide to retail buyers and consumers, but is not included on the box.

While important questions have been raised about the use of lifecycle analysis in documenting environmental claims, it is quite clear that without such a comprehensive analysis, we could all end up supporting the wrong environmental choices.

LINDA BROWN
Vice President
Green Cross
Oakland, Calif.

OIL TALK

I was dazzled by Amy Martin's impressive piece on petrochemicals. As a technical writer, I know how hard it is to write well about complex technical topics. She did a fine job.

REBEKAH CRESHKOFF
New York, N.Y.

I wish to clarify several points in "The Green Police" article which I believe did not accurately characterize the Green Cross efforts.

- Our logo has never been used as a simple seal of approval. We have strict requirements about the way our certification symbol may be used.

- "State-of-the-art" is not defined by Green Cross, as the article suggests, but by industry itself. In our system, state-of-the-art means the highest level of performance that's been demonstrated for a given product category on a continuous, significant production scale.

- The reference to our certification of household cleaners should have mentioned that these products have been certified as biodegradable, while 40 other similar products could not qualify for this certification.

- Boxed Clorox bleach does *not* wear the Green

Amy Martin's "A Petrochemical Primer" (Sept/Oct) maintains erroneously that world reserves of oil are dwindling. There are more proved world-oil reserves today than at any time in history. To the extent there is an oil-supply problem, it is that two thirds of the known reserves are concentrated in the Middle East, a highly unstable part of the world.

The most sensible response to our growing dependence on insecure foreign oil involves these steps: continuing to fill the Strategic Petroleum Reserve; encouraging



ILLUSTRATION BY ROBERT PRINCE

Announcing the end of the *silent* check.



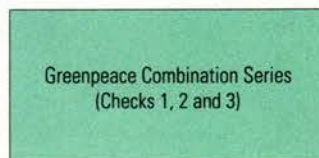
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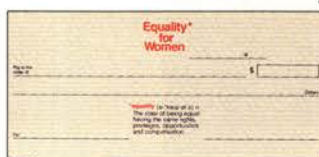
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"It's working! Thousands of you are now using Greenpeace checks. Use these checks, and help us spread our message."

Peter Bahouth,
Executive Director, Greenpeace

"Here's another way to give animals a voice... Message!Checks. You'll increase awareness of our critical work and help us fund our programs."

Alex Pacheco
PETA Chairperson

"Order today and send the message that you will not settle for less than full equality and the right to choose."

Molly Yard
President, NOW

A special offer.

Now you can speak out with every check you write. For clean oceans. Protection of natural habitats. Freedom of choice. For an end to animal testing. You can show those with whom you do business that you are working for a better world. By using Message!Checks.®

The startling facts.

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Don't write another silent check. Not when you could be showing your support for Greenpeace. PETA. Audubon. Or NOW. Order today!

Satisfaction guaranteed or a full refund will be provided.

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- ☐ 3. You Can't Sink a Rainbow
- ☐ 3a. Combination series of above

People For the Ethical Treatment of Animals

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National Organization For Women

- ☐ 6. Equality For Women
- ☐ 7. Protect Our Right to Choose

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To the extent there is an oil-supply problem, it is that two thirds of the known reserves are concentrated in the Middle East.

development of oil resources both at home and throughout the world; and developing alternatives to conventional energy use when those steps would cost no more than importing oil.

Environmental concerns arising from development are best addressed by government and industry working together.

WILLIAM R. O'KEEFE
Vice President
American Petroleum Institute
Washington, D.C.

McMIFFED

How appropriate that Art Kleiner's "Theatre of the McServed" (Sept/Oct) appears in a journal called GARBAGE. Why is it so damned difficult to praise the good intentions of a large corporation that's trying to improve its environmental stewardship?

Why not let your journal take the leadership approach of encouraging each "two steps forward," instead of brow-beating a company back into its clamshell?

TERESA YANCEY CRANE
Publisher and Editor
Corporate Public Issues
Leesburg, Va.

"Indeed, the environment-sensitive consumer may lose every concrete, tangible reason to despise McDonald's."

It seems rather remarkable to me that Mr. Kleiner could pen such a statement in 1991. Although it's commendable that McDonald's is reducing their packaging waste, they unfortunately sell a product that is responsible for a disproportionate amount of environmental destruction, waste, and pollution — i.e., meat.

TRISHA LAMB FEUERSTEIN
Lower Lake, Calif.

WATCH WHO YOU CALL PILGRIM!

Your piece "Pilgrim's Progress" (Sept/Oct) on the Northeast Sustainable Energy Association's American Tour de Sol solar- and electric-car race missed the point. In addition to the vehicles that you chose to write about, many of the cars that ran in the event are practical commuting cars, and several of them are on the market today.

NANCY HAZARD
Associate Director of NESEA
Greenfield, Mass.

DUMPING ON THE DUMPSTER

Our cassette-recorded invitation should have received accolades as an environmental marketing innovation (In the Dumpster, Sept/Oct). Our thorough evaluation indicated that a cassette album with a story and invitation from Dr. Goodall and James Earl Jones, et al., would be collected (and they were!), rather than be guaranteed garbage.

This unique approach had considerably less waste than a standard, "acceptable" paper invitation. Jane Goodall and her organization will never selfishly compromise the environment.

MICHAEL AISNER
Gombe 30 Project
Boulder, Colo.

KEEP GARBAGE CLEAN

As an elementary school principal and former science teacher, I was very impressed by the quality and diversity of your articles. However, I am distressed by the back-cover advertisement by Patagonia. The good intentions are, unfortunately, overshadowed by the bold and colorful word at the top of the ad. Is this really necessary? Our students are not only being taught to be environmentally conscious, but are also being taught to use appropriate language. If ads like this are going to be commonplace, I will have to instruct my librarian to cancel our subscription.

ROBERT J. REID
Mountain Lakes, N.J.

OUR MAINE MAN

I've been reading your magazine since the beginning. I want to applaud your efforts and encourage your continued success.

One story I'd like to learn more about is Charlie MacArthur's TWERP ("Visionaries: The Future of Garbage" Sept/Oct). How can I get in touch with Charlie?

DON RUDY
Salt Lake City, Utah

Charlie reports that in response to the article, he's received letters from as far away as Fiji and the Philippines. He welcomes letters, but please don't call. P.O. Box 355, Sangerville, Maine 04479.

CORRECTION

Contrary to what was reported in "Getting Rid of Batteries" (Sept/Oct), the Iowa Dept. of Natural Resources does not oppose legislation requiring source separation of household batteries.

Also, the article referred to four companies that accept old batteries. Here are their full names and addresses:

Chemical Waste Management, Controlled Waste Division, W. 124 N. 9451 Boundary Rd., Menomonie Falls, WI 53051; (414) 255-6655.

Inmetco, 245 Portersville Rd, Route 488, Elwood City, PA 16117; (412) 758-5515.

Mercury Refining Company, 790 Watervliet-Shaker Rd., Latham, NY 12110; (518) 785-1703.

Environmental Systems Corporation (ENSCO), P.O. Box 1957, El Dorado, AK 71731; (501) 863-7173.

Test your **GARBAGE IQ** Take this E-Z Quiz!

1. The term "greywater" generally refers to:

- The water surrounding fuel rods in a nuclear plant.
- Wastewater from household sources used to water lawns and gardens.
- Tainted spring water.

2. When completed, the largest structure in the world will be:

- A 42-screen multiplex in the San Fernando Valley.
- The Leningrad McDonald's.
- The Fresh Kills landfill on Staten Island, New York City.

3. "Compact Fluorescents" are:

- New pesticides that are highly concentrated and very toxic.
- Energy-saving light bulbs that use 75% less electricity than standard tungsten bulbs.
- A new all-midget rock band.

4. **GARBAGE** magazine is:

- Your best source for practical environmental information.
- Even cheaper if you subscribe for 2 or 3 years.
- Printed on recycled paper.
- A great gift for that special someone.
- Read by top Hollywood celebrities.
- All of the above.

Answers:
1-b; 2-c; 3-b; 4-f

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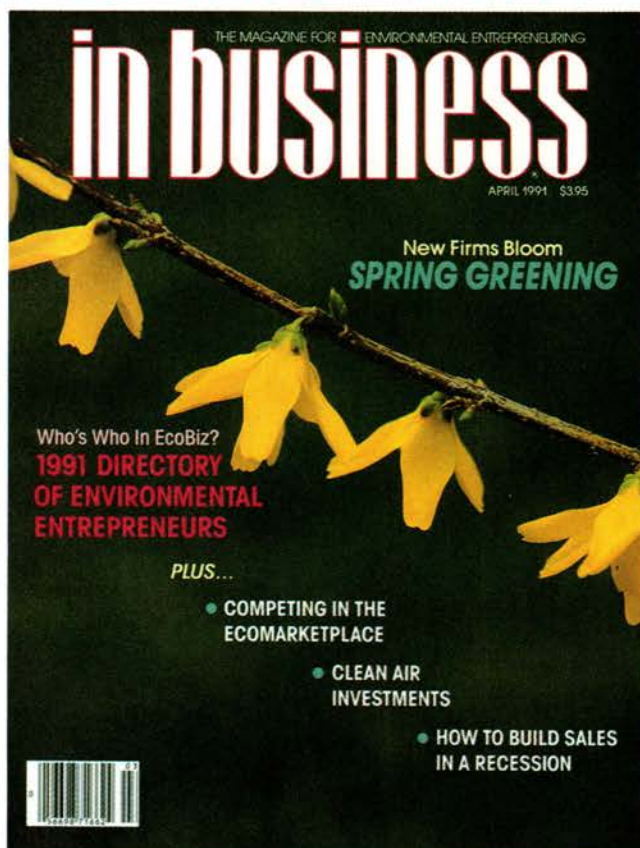
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The Greatest Flow on

Come on folks, step right up to the Big Apple's 59th Street Marine Transfer Station — the sanitized name for a garbage-barge depot. This is your chance to see, hear, smell, and reflect upon the wonders of New York City's flotsam!

See recycling from the *inside* as you climb through The Passage Ramp, a block-long tunnel lined with tire shreds and crushed soda bottles, aluminum scraps and wood chips! Emerge

into The Glass Bridge, a glassed-in observation deck suspended over water. From here, witness The Violent Theatre of Dumping, staged on a tipping floor that's longer than two football fields. You'll marvel as a parade of garbage trucks roll up a ramp, lift their hoppers, and drop their payloads into waiting garbage barges.

For you high-culture types, sanitation engineers present an Industrial Ballet as they cast nets over a loaded barge and guide it with ropes into the Hudson River. A tug lugs the barge downriver to Staten Island, where bulldozers haul its contents to Fresh Kills, the planet's largest landfill. In another decade, Fresh Kills will be the second-highest point on the Eastern Seaboard, and you can watch it grow — while you're standing in midtown Manhattan! How so? Check out The Media Flow Wall, a bank of closed-circuit cameras linking Fresh Kills, the Hudson (from underwater!), and the 59th Street station.

It's all part of Flow City, a multimedia installation that transforms the transfer station into an up-to-the-minute tourist attraction. It's the first disposal system in the U.S. designed for public viewing. Go ahead, wise guy, call it garbage. Its creator, Mierle Laderman Ukeles, wouldn't have it any other way.

As artist-in-residence at the New York City Department of Sanitation, Mierle has spent the past 12 years tirelessly trying to reverse our tendency to shove waste out of sight and mind. "The garbage crisis is really a crisis in creativity," she says. "We're very good at producing and acquiring

Artist Mierle Laderman Ukeles is transforming a New York City trash-transfer station into Flow City, soon to be a major tourist attraction.



DANIEL DUTKA

Earth

ing all this stuff, but when we're done with it, the creativity stops."

If Mierle hasn't made a splash at your local art gallery, it's probably because she leaves her work where she finds her materials — at dump sites and landfills. And transfer stations. "Here at Flow City, you'll see the accumulation of all those garbage cans that each of us puts at the curbside each week," she says while gazing down from the observation deck into a barge's yawning maw. "After seeing this, you'll never be able to say your garbage doesn't matter."

Settle down now, don't crowd the station's entrance. It will take another year or two before Flow City opens its gates to the public. So far, The Glass Bridge is in place, and The Passage Ramp's concrete structure is complete. Mierle can't install the rest of the art until she raises more money. Meanwhile, the transfer station is a home for New York's garbage — 620 tons are delivered daily.

"Garbage is chaos — it takes highly skilled work to deal with it," she yells over

the din. "Here at the station, every ounce of garbage gets weighed, they weigh it like it's gold, even though people throw it out because it has no value."

Over a decade ago, Mierle won the grudging affection of New York's 8,500 sanitation workers when she shook *all* their hands in a year-long art performance. Back then, she was curious about the people hidden behind big, impersonal maintenance systems such as New York's waste-disposal system. So she called the sanitation commissioner and talked him into letting her join workers on their garbage runs.

She found a pretty dispirited bunch, trying heroically to keep pace with the vast, churning, disgorging creature that's New York City's waste stream. "People's attitude

FOR THE RECORD

"We had our day in the sun. And it's not like we're not going to die anyway."

Les U. Knight, an Oregon activist who advocates childlessness through his Voluntary Human Extinction Movement.
(*New Age*, Sept./Oct. '91)

Continued on p. 15

GARBAGE DICTIONARY

DUMP — *noun*. As early as the 15th century, "dump" referred to a fit of "melancholy" (as in "down in the dumps"). It wasn't linked with garbage until 1865, when *Harper's Magazine* first used the term to describe the waste piles left by Rocky Mountain miners.

According to Martin Melosi, author of *Garbage in the Cities*, "land" joined "fill" in the 19th century to describe the "reclaiming" of coastal areas by dumping garbage. But as cries went up from unfortunates living near the rat-infested mounds, policymakers began looking for a dump that was more refined. They labeled it with an appropriate euphemism, and so we got the "sanitary landfill."

It was Jean Vincenz, director of public works in Fresno, Calif., during the 1930s, who designed the first sanitary landfill in the U.S. "Sanitary" meant compacting garbage and covering it with dirt after each day's dumping. The practice was hardly sanitary. Well into the 1970s, many so-called sanitary landfills were little more than open pits.

Inevitably, there now comes a new, improved dump — the "secure sanitary landfill." (You can find one in Cape May, N.J., although engineers there can't say who coined the term.) It has double liners and an extensive leachate-collection system for protecting groundwater. Still, the environment's gain is the lexicon's loss: "Dump" is terse and unpretty and, in the thudding finality of its sound, as expressive as any word around.

— Bill Breen

FOR THE RECORD

“Their purchasing behavior suggests they are looking for easy fixes, such as interchangeable alternatives to existing products.”

Writer Jacquelyn Ottman recommends marketers establish a competitive advantage by offering said quick fixes. (*Green Marketing Report*, July '91)

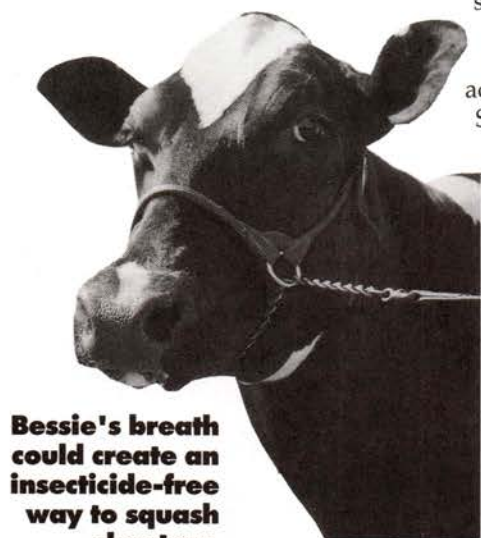
• Baited Breath

Like bees to honey ... mosquitoes to cow's breath? Scientists at the U.S. Department of Agriculture laboratories in Gainesville, Florida, have found that chemicals in cow's breath are a powerful lure for mosquitoes. Researchers are extracting these chemical ingredients and using them to bait traps to attract the whining buggers. An insecticide, permethrin, finishes them

off. The beauty of the bovine bait is that it could eliminate the need for large-scale insecticide use.

According to entomologist Daniel L. Kline, a blend of octenol and carbon dioxide is the secret ingredient that attracts mosquitoes. Carbon dioxide entices nearby flies, while octenol acts as a long-range lure. Some species of mosquitoes find ruminant breath irresistible. After three years of testing, just five of 35 species were enticed by the blend. Researchers plan to test up to 71 species.

The prospects for developing a commercial trap are promising, but Dr. Kline advises people not to hold their breath. Researchers are still trying to determine the right chemical mix for making a trap that's commercially feasible.



Bessie's breath could create an insecticide-free way to squash skeeters.

• Bogged Down in Regs

Want to site a landfill in Maine? You may be caught in a regulatory Catch-22 pitting the state Department of Environmental Protection against the federal Environmental Protection Agency.

Maine's DEP requires that landfills be sited on relatively impermeable soil, which usually means clay. (We shouldn't build landfills where rotting garbage could leach into groundwater, right?) Trouble is, most of Maine's clay is found at the bottom of wetlands. Building landfills on cheap, undevel-

oped wetlands was once popular — New York's infamous Fresh Kills Landfill is built on 2,200 acres of salt marshes — but the EPA long ago threw that idea in the ash heap.

All of this leaves Henry Warren of Maine's DEP in a bit of a bind. Mr. Warren is heading up the effort to find a home for a 40-to-60-acre landfill, a near-impossible task according to Andrew Tolman, former chief hydrogeologist for the state. Any 40-acre tract in Maine, Mr. Tolman says, will have some wetlands on it.

The solution? Federal regulators may have to create special exemptions for individual states allowing landfill development on some types of wetlands. Responds Mr. Warren, "We're working with a consultant."

• Coded Cars

Auto makers in the U.S. have adopted a coding system that will do for car recycling what the SPI code did for plastic bottles. The code, which all auto makers will stamp into plastic-car parts, identifies the resin that makes up each part, from the windshield-washer jug to the dashboard doo hiekeys. Because many "engineering" plastics are loaded with coloring, reinforcing, and stabilizing additives, each variation must be recycled separately.

The code, along with engineering changes that make the parts easier to dismantle, is part of a trend called "design for disassembly" (or in hipper circles, "D for D"). Led by German auto makers (who may soon be required to take back old cars for recycling), manufacturers are beginning to count recyclability among the components of good design.

• Painting with Poison

If you read the labels on art supplies before you buy them, pat yourself on the back. Then induce vomiting. According to a survey of art products, many labels paint a deceptive picture of product safety.

The Public Interest Research Groups (PIRGs) cruised arts-and-crafts stores, checking the warning labels against the ingredients, and found that 44 percent of products with toxic ingredients did not list the associated long-term health risks — labeling required by federal law.

Continued on p. 16



DANIEL DUTKA

The view from Glass Bridge:
Tourists will bid the trash
farewell as it sets sail down
the Hudson to Fresh Kills —
the planet's largest landfill.

was somehow, the garbage problem was the garbageman's fault," she recalls. "I was there as a stand-in for the public, to tell the workers that it's not their garbage, it's *our* garbage."

It was during that episode that Mierle first came upon the 59th Street transfer station. And it was the sanitation workers who planted the idea for her *magnum opus*. "Flow City came from the workers," she says. "They kept saying, 'We go to the public's neighborhoods all year long. Why can't they come to us for a single day?'"

With its postcard view of Manhattan's glass-and-steel towers, the station seems ideally suited to her mission to bring us face to face with our waste.

"Everyone is working so hard so they can buy more stuff," says Mierle as she looks east toward the city's office buildings. She turns and takes in a row of dump trucks and a barge half-filled with mounds of trash. "And here's the material world in flux, where things go from being valuable to having no value at all. Someday, people can come to Flow City and watch all the leftovers float away."

— Bill Breen

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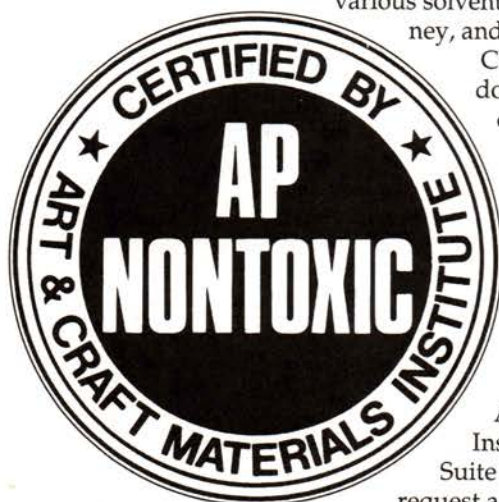
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FOR THE RECORD

"I'll tell you one thing, you're going to be able to see the dump real good from the road now."

Gerald Fortin's farm in Benton, Me., was targeted for a dump, so he cut 50 acres of trees that would have formed the required buffer zone. (Portland Press Herald, Sept. 26, '91)



Look for this seal for info on the toxicity of arts-and-crafts supplies.

The Art & Craft Materials Institute has criticized the survey for ignoring formulation. (The toxic ingredient in a product might be diluted or ameliorated by another ingredient.) That said, the most common products the PIRGs deemed to be out of compliance are turpentine (whose various ingredients may cause allergic sensitivities, respiratory problems, and birth defects); rubber cements (allergic sensitization plus blood, kidney, liver, brain, bone-marrow, and central-nervous-system damage); and markers (whose various solvents may cause heart, liver, kidney, and bone-marrow damage).

Children, whose little bodies don't handle toxics well, are especially at risk. The full report, *Art and the Craft of Avoidance*, includes a list of alternative products which art teachers will find useful. The report costs \$6. U.S. PIRG, 215 Pennsylvania Ave., SE, Washington, DC 20003; (202) 546-9707. Or write the Art and Craft Materials Institute, Inc., 100 Boylston St., Suite 1050, Boston, MA 02116 and request a free list of products certified to be non-toxic.

• Hallelujah Hotline

Environmentalists are sometimes accused of pursuing their cause with religious devotion. Many wouldn't have it any other way. "To be genuinely religious in this day and age is to be environmentalist," says Paul Gorman, executive director of the Joint Appeal in Religion and Science.

Mr. Gorman's group, which unites religious leaders and scientists in the name of raising environmental consciousness, has launched an environmental hotline for churches, synagogues, and mosques. Religious groups call the toll-free number to swap ideas. Located in the Cathedral Church of St. John the Divine in New York, the Green

Congregation Network fielded 60 calls in its first three days. Their number: (800) 435-9466.

• EPA Fines Fail the Laugh Test

For some companies, getting their hands caught in the environmental cookie jar may not be so bad. The General Accounting Office, the investigative arm of Congress, reports that most of the penalties levied by the EPA failed to offset financial gains by companies that broke environmental laws.

The EPA is required to slap polluters with a fine that at least equals the amount gained by violating environmental regulations. But the GAO says there's no evidence that the EPA has even *calculated* penalties that cover the regulations. Although the EPA's penalty assessments totalled \$28 million in 1990, it's impossible to determine the minimum amount the agency should have collected.

The EPA can increase a fine if it finds that the original amount is "grossly deficient." And what does "grossly deficient" mean? The agency's federal enforcement policy simply defines the term as "a judgement call made on a state-by-state basis." Regional officials have come up with their own formula. They call it the "laugh test." Put simply, if the penalty assessed is so low that it lacks credibility, it's labeled "grossly deficient."

• Sandy Garbage

Introducing a new European process that turns household garbage into an inert, sandlike material. The Swiss company Gomacris has built a plant in Lyon, France, where household waste is shredded, treated with lime and calcium carbonate, pelletized, blasted with high-intensity light, cooked under pressure, and dehydrated into a powdery silt. The result, the company claims, is a "sand" of considerably reduced volume that can safely be dumped "anywhere," or sold as kitty litter, insulation, or organic fertilizer.

The catch? The price tag for a plant with a capacity of just 206 tons per day is over \$15 million. *The Toronto Star* estimates that it would take 40 plants, costing \$600 million (Canadian dollars), to meet Toronto's yearly garbage-disposal needs. The plants are designed to recover only metals, so they don't exactly encourage recycling.

STOP!

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**How much
alcohol do
we drink?
It's a loaded
question ...
so to speak.**

A

s I considered various topics for this, my first GARBAGE essay, one poignant bag of refuse, recorded during the fall of 1974, sprang to mind. It, like the other 15,000-plus samples of household discards our Garbage-Project sorters have recorded, came from the trash one household had put out on a bi-weekly garbage pickup day. Unlike other samples, inside this brown-paper grocery bag, all of the packages were still nearly full:

- 1 10-pack of Cudahy beef wieners — unopened.
- 1 24-oz. loaf of Rainbo white bread — 4/5 unused.
- 1 14-oz. bottle of Kerns tomato catsup — 3/4 full.
- 1 6-oz. jar of French's mustard — 4/5 full.
- 1 16-oz. jar of Best Foods mayonnaise — 5/6 full.
- 1 16-oz. box of Blue Bonnet margarine — 5/6 unused.
- 1 2-oz. pack of Lipton soup mix — unopened.

These artifacts suggested an outing that was never to be: John and Martha were going on a picnic. But first John put their garbage out in a brown-paper bag. Then Martha took their picnic out in a brown-paper bag. When John and Martha arrived at the picnic ground, they found that they had brought their garbage for lunch.

How could such a mixup happen? One item in the bag indicated significant consumption ... and a possible answer to the question:

1 pint bottle of Southern Comfort ("The Grand Old Drink of the South") — nearly empty.

All too many of us can understand how the mixup might have occurred.

When I think of this case, I am reminded of a basic human truth, so often reaffirmed when sorting garbage: What people *say* they do and what people *actually* do are two different things.

When asked during the 1970s to report on their beer consumption for a health survey, 70 to 80 percent of the respondents in a typi-

cal Tucson neighborhood reported no consumption by any household member (at home or away) during an average week; 20 percent or so reported total household consumption at seven or fewer beers; and only a handful of respondents, if any, reported emptying more than seven containers.

The record of garbage sorts from the same neighborhoods at the same time is distinctly different: 25 percent of household refuse samples contained no beer bottles or cans (and no beer caps or pull-tabs from recyclables); 25 percent held one to seven empties; and 50 percent revealed *more* than seven beer empties — a few households were consuming at the rate of a case every 3.5 days. (Party remains were excluded. Parties were identified by substantial quantities of snack-food packaging, tubs of wasted dip, soggy paper plates and cups, and/or by the "smoking gun" of parties: cigarette butts in stale beer, the smell of which will stay with me to the grave.)



The picnic that wasn't: What do you suppose happened here?

The use of alcoholic beverages is one of the most misdocumented aspects of consumer behavior. Part of the reason, of course, is that few people who drink large quantities of alcohol openly admit this to interviewers. Furthermore, many who drink, but not obsessively, still prefer to remain oblivious to

just how much alcohol they consume, thereby deceiving themselves as well as interviewers. The result is that both medical and market researchers find a consistent gap of from 40 to 60 percent between the amounts of alcohol brewed, fermented, and distilled for consumption (including imports) and the amounts people own up to imbibing.

The Surrogate Syndrome

THE GARBAGE PROJECT'S archaeological perspective, which is totally independent of self-report bias (archaeologists have other problems), has identified some interesting patterns. One could assist those who want to record alcohol use through interviews. The "surrogate syndrome" states that if a respondent reports personal drinking, then all reports of alcohol use from that source are likely to be under-reports; on the other hand, if the respondent reports no personal use of alcoholic beverages, then he or she is likely to tattle on housemates with chilling accuracy.

Other Garbage Project studies of alcohol consumption have run from the esoteric to the highly pragmatic. Undergraduate Fred Haskell combed through 12 years of data to determine whether at-home consumption of beer fluctuated in sync with the phases of the moon. It did not. But it did fluctuate in response to paydays.

I have long maintained that garbage is the great equalizer, being the material reality of the American Dream. At first glance, alcoholic beverages would seem to contradict that assertion: Lower-income neighborhoods are characterized by beer (in bottles) and some hard liquor; middle-income neighborhoods drink everything — beer (in cans), wine, and hard liquor; upper-income neighborhoods discard better wine and large hard-liquor bottles (often not as prestigious and expensive as those from middle-income households) along with a few rot-gut beers. Yet, amazingly, 18 years of research indicates that just below the surface lies equality.

Boil all the data — the beer, the wine, the hard liquor containers — down to the alcohol delivered by each, and the average household consumption across neighborhoods studied does not vary one whit. Picnics are likely misplaced at all levels of society.

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The Return of the Red Wolf

The first-ever attempt to restore a carnivore species driven to extinction in its former range — and so far, the experiment is working.

The red wolf (*Canis rufus*) is our country's only native wolf. Larger than the coyote but smaller than the gray wolf, it once roamed the hardwood forests and river bottomlands of the Southeast; but timber cutting and government-sponsored trapping and poisoning nearly destroyed the species. By the 1960s, biologists could find only several dozen sickly survivors in swampy pockets rimming the Louisiana and Texas coasts.

In an eleventh-hour rescue, the U.S. Fish and Wildlife Service captured the wolves, air-lifted them to a mink farm in Washington state, and bred them in

captivity. Since 1987, 36 adult wolves have been released into the cedar bogs of the Alligator National Wildlife Refuge in North Carolina. They've birthed 15 pups — proof that the animal can make the difficult transition from captivity to life in the wild. (On the downside, 23 wolves have died since '87.)

Wildlife managers see a black irony in their last-ditch efforts to maintain the species and protect its diminished habitat. "Years ago, the government spent a lot of money trying to kill off the red wolf," says Mike Phillips of the Red Wolf Recovery Project. "Now we're spending even more trying to bring it back. What we should be doing is preventing [habitat-loss] from occurring in the first place."

—Bill Breen



Biologist Phillips fits a wild-born red wolf (whose coat can vary from tawny to cinnamon to gray) with a radio tracking collar.

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Millions in U.S. homes

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116
90
86
80
72
27
14
13

Source: Rocky Mountain Institute;
American Council for an Energy-Efficient Economy

SWEET TALK

Sugar in 12 oz. of regular Pepsi: **10 teaspoons**

Sugar in 12 oz. of regular Coke: **9.8 teaspoons**

Caffeine in 12 oz. of regular cola: **30-48 mg**

Caffeine in 5-oz. cup of brewed/drip coffee: **15 mg**

Amount of CO₂ contained in 12 oz. of soda: **2.8 g**

Amount of CO₂ annually released into the atmosphere from soda:
78,857,143 lbs.*

*CO₂ used in beverages is a by-product of industries including brewing, baking, coal, and oil.
Source: Nutrition Action Center; National Soft Drink Association; GARBAGE staff

SHIP 'EM OUT

Number of soft-drink containers shipped in 1990	Percentage recycled
Aluminum cans: 49 billion	64
Glass bottles: 9 billion	20
PET bottles: 8 billion	29
Bimetal cans: 4 billion	33

Source: National Soft Drink Association

SODA, SODA EVERYWHERE

Soda consumed in U.S., 1990:
1.2 billion gallons

Number of supertankers required to carry that load:
19

Soda consumed annually per person:
47 gallons

Water consumed annually per person:
37 gallons

Milk consumed annually per person:
21 gallons

Source: BeverageWorld; EcoSource; GARBAGE staff

PITCHING POP

Combined advertising budget of Coca Cola and Pepsi, 1990:
\$316 million

Combined advertising budget of the milk industry, 1990:
\$60 million*

Average price of 16 oz. of soda, Aug. 1991:
\$0.43

Average price of 16 oz. of milk, Aug. 1991:
\$0.32

Average price of 16 oz. of tap water, Aug. 1991:
\$0.0002

*Includes members of the National Dairy Board and United Dairy Industry Association.
Source: AdWeek; United Dairy Industry Assoc.; USDA; GARBAGE staff

RAZZO



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Environmental CAREERS

A GARBAGE PRIMER FOR ECOEDS

**So you want a career
in the environmental field?**

**Job prospects are good
in many areas. Here's help**

**finding your career
path, whether you're**

**a high schooler
or an entrepreneur.**

by Amy Martin

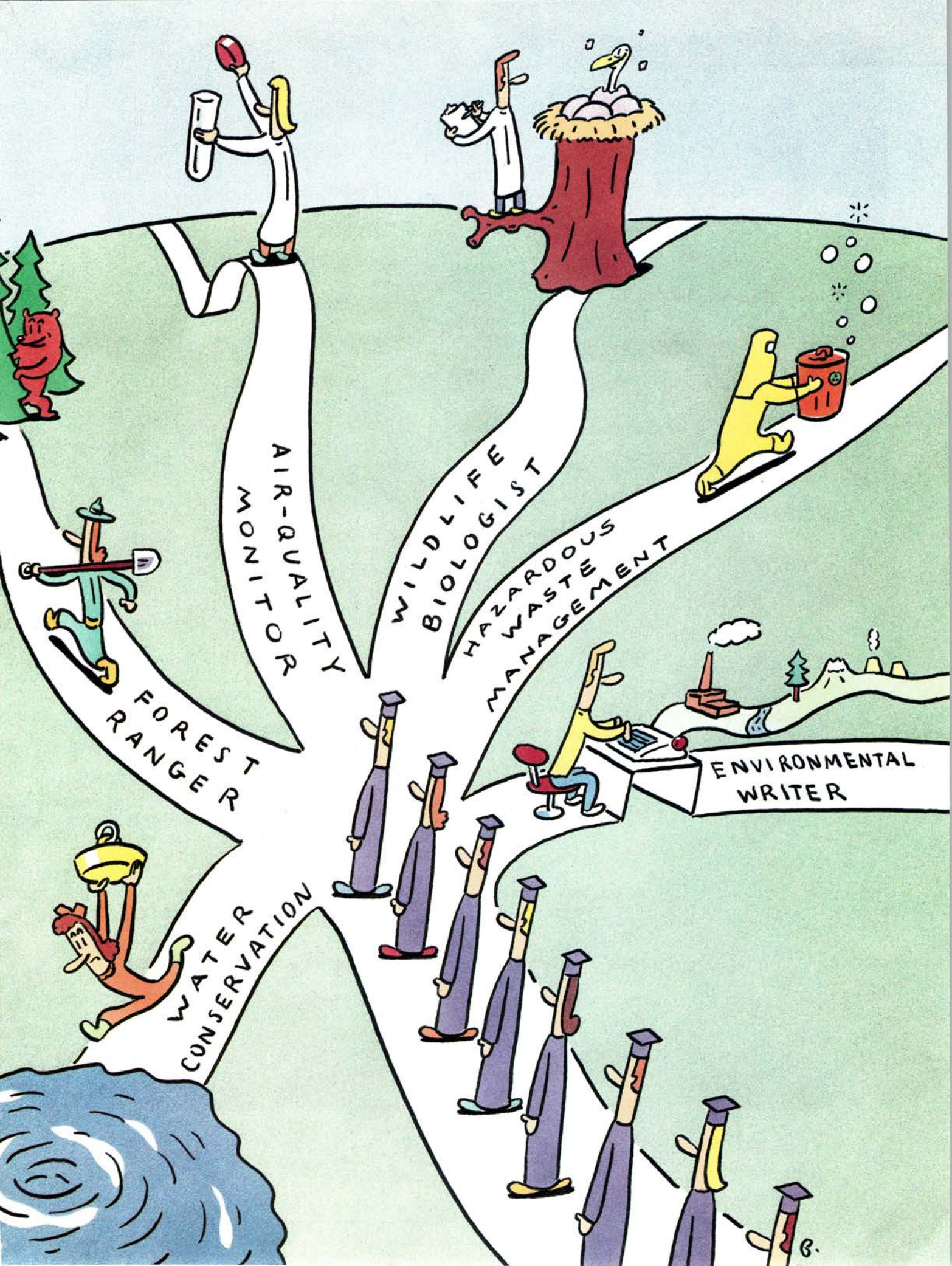
**ILLUSTRATIONS BY
PHIL MARDEN**

AS A HIGH SCHOOL student in the early '70s, enamored of the environmental movement and tired of my ugly urban confines, I decided to be a forest ranger. It was the perfect job: a tower with a view, lots of trees, wild critters who didn't complain when you played loud music. And math wasn't required.

Then, while backpacking one summer, I saw what an entry-level forest ranger really does. Any communing with the wilderness came in the form of clearing brush covered with poison ivy and cleaning up human messes. Home was a windy, wood-frame shanty with no electricity or running water. A nice place to visit, but ... you know.

Twenty years, a college degree, and several occupations later, I'm finally in the right niche — environmental journalist, white collar with a view. Sometimes, the view takes in a snake-infested, illegal tire dump or corroding vats of toxic waste. Most of the time, the ticking of the deadline clock drowns the sound of babbling brooks. The reality of an ecological career usually means that wilderness is something you see only on your annual vacation. Your ultimate goal may be Nature, but the way to get there is high-tech and usually urban.

These days, saving the environment most likely requires a degree in chemistry, for analyzing polluted groundwater samples; or engineering, for designing machinery to filter those pollutants; or communications, for creating educational programs to teach people how used motor oil tossed in an open field can contaminate their drinking water. Anyway you go about it, science — and math — are eventually required.



Environmental CAREERS

A Primer for Ecoeds

The reality of an ecological career means wilderness is something you see on your annual vacation. Your ultimate goal may be Nature, but the way to get there is high-tech and usually urban.



THE GOOD NEWS IS that the scramble among companies for environmentally educated graduates is so intense, recruitment competition rivals that for star athletes.

"I tell companies planning to look for new talent at the junior-class level that the best [students] are already taken," says Ron Cohen, a professor of environmental science at Colorado School of Mines.

Improving air quality through better equipment design, better emission monitoring, and understanding the mechanics of global climate change is equaled in environmental-career potential only by water-quality issues, particularly those involving groundwater sources. Energy conservation, renewable-energy technologies, and solid- and hazardous-waste management are three other growth areas. All in all, we're talking degrees in biology, chemistry, geology, mathematics, physics, and, of course, engineering.

Pollution plus the 16 federal environmental-protection acts passed since 1970 are fueling the surge in jobs. Efforts by government agencies to maintain present levels of waste disposal, and air and water quality, run a whopping \$15.6 billion annually. Cutting pollution was a \$115 billion operation in 1990. The EPA's estimates have that figure rising to \$185 billion by 2000. Over 33,000 hazardous-waste sites are on the Superfund list. And don't forget the 7,000 toxic messes created by the military.

Thousands of technicians, scientists, engineers, managers, and administrators will be needed to clean it all up, plus educators to teach them and communicators to create the educational materials. It's predicted that 22,500 environmental engineers are needed in the next few years to deal just with toxic chemicals. And the federal Department of Energy estimates it will need 10,000 to 20,000 environmental professionals in the next decade. (About 20 percent of all environmental graduates will work for the federal government.)

The need for environmental services overseas, particularly in Eastern Europe and Asia, is also nourishing the job boom. Opportunities for consultants who track in-

ternational government regulations and technological changes abound.

Job prospects in the environmental field have expanded since the '60s, when environmental careers dealt almost exclusively with natural resources: forestry and farming, land and water conservation, fish and wildlife management, parks and recreation. Now, the three Rs of environmental careers are Remediation (cleaning oil spills and toxic messes); Recycling (developing collection systems and jump-starting markets); and Restoration (managing natural resources and helping damaged areas recover).

...

ENVIRONMENTAL EDUCATION is as interdisciplinary as the ecological web of life is interconnected. Physical and applied sciences are at the core, but even microbiologists must be knowledgeable enough in the social sciences (such as psychology and politics) to deal with the human side of environmental issues. A proficiency in economics and business is required to take research into the real world. All these facets must be enhanced by communications skills, because ultimately the permanent solution to ecological problems lies in education.

Many job-placement experts agree that in any career situation, especially one in the environmental field, a balance must be played between well-rounded generalism and marketable specialization. At a minimum, you should have a skill to show for your years in school. Quite a few high-minded generalists with ecology degrees can't find a job.

Sure, we need people who can see the big picture. But it takes hands-on skills to handle chronic environmental problems.

Employers are most interested in graduates with double majors: physical sciences and communications for an environmental writer; business and ecology for a manufacturing-operations manager (who ensures that environmental laws are followed). Yale University's environmental-studies program *requires* a double major. Double minors are also viewed ap-

preciatively, such as environmental engineering with a long list of science courses relating to air pollution, which could lead to a job designing equipment for monitoring and capturing incinerator emissions.

Think of environmental education as a path with lots of tangents. It may take well over the standard four years, if not a lifetime, to complete. A budding geologist with a bachelor's degree might begin in the outdoors, gathering data; and then earn a master's degree in statistical analysis for interpreting that data — in an office, at better pay. A Ph.D. in cryobiology, the study of organisms in frozen environments, might come later, along with the managerial acumen for leading a research project.

So get your skills, but don't just simply prepare for a job. Get an environmental education to learn how to learn, to train your brain. Get excited about knowledge, folks, because knowledge well implemented will help ease our environmental woes.

Attention COLLEGE STUDENTS!

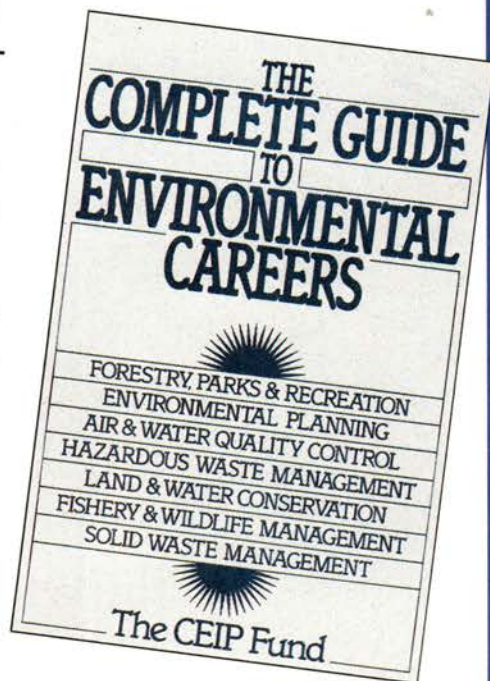
THE NATIONAL ASSOCIATION of Environmental Educators estimates that, nationwide, there are 125 to 200 environmental programs at four-year universities. Enrollment has doubled or tripled at environmental-studies programs at University of Colorado at Boulder, Southern Vermont College, Colorado School of Mines, and many other universities. Any school with "Tech" in its name is likely to have an environmental program, particularly in engineering and the sciences. State universities usually emphasize applied science and agriculture, and often offer environmental courses, particularly in resource management.

Some areas are better for an environmental education than others. New

Pollution plus the 16 federal environmental-protection acts passed since 1970 are fueling the surge in jobs.

THE CAREER BOOK

TO GET AN IN-DEPTH idea of what environmental jobs are really like, the Boston-based Environmental Careers Organization, Inc., (formerly the CEIP Fund), has published *The Complete Guide to Environmental Careers*. The book divides the job market into three categories: planners, educators, and communicators; environmental protection (solid- and hazardous-waste management, air and water quality); and natural-resource management (land and water conservation, fishery and wildlife management, parks and recreation, forestry). Chapters cover the job market, entry-level prerequisites, and salary range. Also included are excellent addendums of additional info sources plus listings of organizations, publications, and job-referral services. Price: \$17.45 ppd. Environmental Careers Organization, Inc., 286 Congress St., Dept. GM, Boston, MA 02210; (617) 426-4375.



Environmental CAREERS

A Primer for Ecoeds

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England and the Atlantic Coast, with their long history of ecological problems, have high concentrations of pollution and colleges with environmental programs. Top-ranked programs can be found at College of the Atlantic (Bar Harbor, Maine), Duke (Durham, N.C.), Massachusetts Institute of Technology (Cambridge, Mass.), Tufts (Medford, Mass.), and Yale (New Haven, Conn.). On the West Coast, one of the most progressive programs is the Environment, Economics and Politics major at Claremont-McKenna College (Claremont, Calif.). And the eco-colleges of the Rocky Mountains — Colorado School of Mines (Golden), Colorado State University (Fort Collins), and University of Colorado (Boulder) — combine beautiful campuses, high technology, and a long tradition of resource management.

To find the right program, head down to your central public library and look up *Peterson's Guide to Four Year Colleges*. It lists 40 types of academic majors associated with the environment. Most colleges get a large academic and social profile, including the faculty research emphasis of each department.

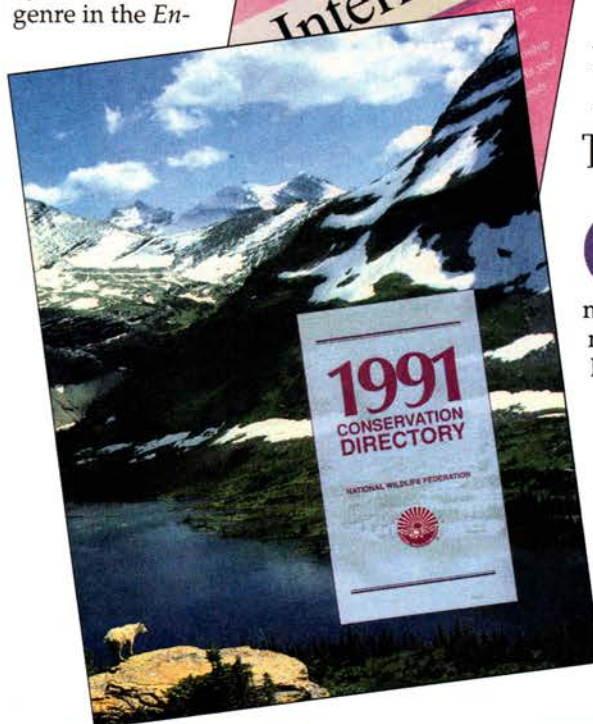
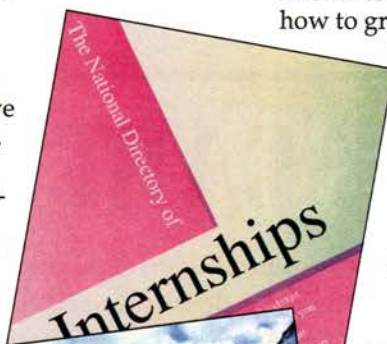
Trade associations will often give advice on colleges, internships, and educational opportunities in their area. All are listed by name and genre in the *En-*

cyclopedia of Associations by Gale Research, available at most large public libraries. Also, trade journals and organization publications will frequently cover educational opportunities in their fields. Descriptions of the journals are included in *Association Periodicals*, also by Gale Research.

Once you're in college, check out the Student Environmental Action Coalition, which is affiliated with more than 1,500 colleges and counts more than 30,000 members. SEAC's main emphasis is on conserving natural resources, although the issue of how minorities and the poor bear the brunt of pollution problems is a major concern. The group has a national magazine, *Threshold*, plus regional newsletters, and offers a variety of fact sheets and organizing guides. Especially handy is the campus environmental-audit package.

SEAC even has their own version of the infamous 100 Simple Things book, entitled *The Student Environmental Action Guide: 25 Simple Things We Can Do*. It runs success stories from colleges practicing environmental awareness, along with suggestions on how to green-up your own school.

To join SEAC, or order a copy of the guide, contact them at P.O. Box 1168, Chapel Hill, NC 27514; (919) 967-4600. SEAC memberships are \$15 annually; the charge for organizations is \$30.



Internships THE REAL WORLD

COMPLETING INTERNSHIPS WHILE YOU'RE still in college helps make connections for future employment. Internships might also help you avoid a lot of grief. Many a forestry-management graduate, fresh out of college, has been dismayed to learn how much of the job involved enduring pressure from superiors to destructively overcut trees. Because recent graduates are often full of energy but lack focus, sometimes it's a good

idea to do your interning *before* you enter college.

Ecological internships abound. Most local and national environmental groups offer them. The National Wildlife Federation publishes *Conservation Directory*, an annually updated sourcebook of national and international environmental organizations, government agencies, and educational programs which focus on managing natural resources. Price: \$22.50 ppd. National Wildlife Federation, 1400 16th St., N.W., Dept. GM, Washington, DC 20036; (800) 432-6564.

Also, the *National Directory of Internships*, published by the National Society of Internships and Experien-

tial Education, includes extensive information on opportunities for interning in the environmental field. Price: \$24.50 ppd. NSIEE, 3509 Haworth Dr., Suite 207, Dept. GM, Raleigh, NC 27609-7229; (919) 787-3263.

The Environmental Careers Organization, Inc., operates the nation's largest environmental-internship referral service. Their internships tend toward wildlife- and natural-resources management, pollution remediation, and environmental health. A 10-year-old nonprofit group, each year it places about 300 college students in short-term (approximately 20 weeks) but paid (about \$360 per week) positions with

About 20 percent of all environmental graduates will work for the federal government.

GREENING UP IN MID-CAREER

GRADUATE PROGRAMS for environmental studies are booming. The reason? Corporations are sending executives and workers back to school for a green polish. (Children are even pressuring their parents to find ecological jobs.) Engineering and science degrees are especially suited to updating. Colorado School of Mines, Harvard, MIT, Tufts, and University of Colorado at Boulder are well regarded for their graduate programs. *Peterson's Annual Guides to Graduate Study* lists universities with 31 types of advanced majors that are linked with the environment.

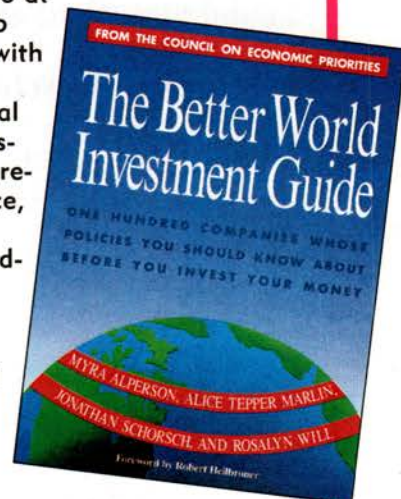
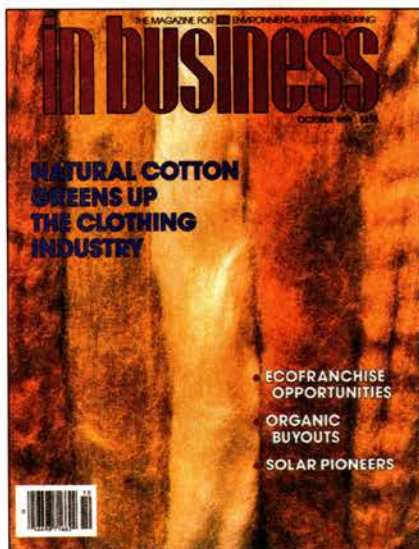
The Environmental Careers Organization, Inc., sponsors conferences and regional career-planning seminars to assist students and recent graduates, as well as professionals and people contemplating careers in the environmental field. Each of their regional offices sponsors at least four half-day events a year. The national conference, held every November, is a networking extravaganza.

Universities with environmental programs often sponsor non-credit, continuing-education courses taught by faculty and guest lecturers. New York University has extensive offerings on environmental management, including a recently launched program on environmental law, marketing, and ethics for business. Courses from the extension service of University of California at Los Angeles update conventional solid-waste management into integrated solid-waste management, with an emphasis on recycling and handling hazardous substances.

Continuing-education course offerings are not commonly listed in college guides, so if you're interested in learning more about a particular program you'll need to contact the university's admissions office.

A publication for environmental entrepreneurs, *In Business* includes job listings in its classifieds section. The bi-monthly magazine will publish articles on career opportunities in upcoming issues. A one-year subscription costs \$18. Jerome Goldstein Press, 419 State Ave., Emmaus, PA 18049; (215) 967-4135.

For those seeking ecologically responsible businesses, the Council on Economic Priorities has several books on the social as well as environmental policies of major corporations. Out of print but still available in some bookstores is *Rating America's Corporate Conscience*, nearly 900 pages of extremely detailed information. It's been replaced by *The Better World Investment Guide*, which focuses on 100 major corporations (price: \$22.95 ppd.). The pocket-size guide *Shopping for a Better World* also profiles companies' ecological and social records, though with far less detail (price: \$7.49 ppd.). CEP, 30 Irving Place, Dept. GM, New York, NY 10003; (800) 822-6435.



Environmental CAREERS

A Primer for Ecoeds

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corporations, consultants, government agencies, and nonprofit organizations. Many students return to work full-time at their place of internship, and later sponsor their own intern.

Based in Charleston, New Hampshire, the Student Conservation Association focuses on internships for high school students and recent graduates who want to work in public and private parks and natural areas. Team-oriented work projects get you into the back country. Each year, the Park, Forest, and Resource Assistant Program places about 750 students in the fields of natural resources, recreation, environmental education, and wildlife management. (About 65 percent of SCA's alumni are conservation professionals.) Most of the participants' travel, housing, uniforms, and living expenses for the 12-week projects are covered, although a salary isn't offered. Contact the Student Conservation Association at P.O. Box 550, Dept. GM, Charlestown, NH, 03603; (603) 826-4301.

After College THE JOB SEARCH

THE STUDENT Conservation Association publishes the magazine *Earth Work*. Formerly entitled *Job Scan*, this monthly magazine lists over 100 internship, seasonal, and permanent work opportunities. Articles cover areas of interest to environmental workers ranging from student interns to executives. Subscriptions are \$29.95 yearly, or \$6 per issue. SCA, P.O. Box 550, Dept. 52G3, Charlestown, NH 03603; (603) 826-4301.

The Job Seeker is a biweekly newsletter that occasionally runs articles ranging from resume-writing tips to info on federal jobs. Seasonal and summer career opportunities are emphasized from December to April. A subscription for 12 months is \$60, three months is \$19.50,

and the summer job series is \$10. The Job Seeker, Rte. 2, Box 16, Dept. GM, Warrens, Wis. 54666; (608) 378-4290.

ECONET, an on-line computer network that links about 100 electronic bulletin boards on environmental topics, includes a job listing board. For sign-up information, write 18 De Boom St., Dept. GM, San Francisco, CA 94107; (415) 442-0220.

Based in Philadelphia, Green Corps is a field school for environmental organizing. This summer and fall, Green Corps will place 45 salaried trainees at sites throughout the country. They will work on a wide range of environmental issues, from organizing state coalitions to fight for a tougher Clean Water Act to assisting college groups in establishing "green campus" programs.

According to Director Gina Collins, Green Corps focuses on the nuts and bolts of environmental organizing: lobbying, fundraising, public speaking, leadership development, and writing for publication. An intensive month of classroom training is followed by a year of field work and real-world organizing. Graduates are expected to have the capability to plan, support, and

lead a regional campaign.

Starting salaries are \$13,500 to \$16,000 a year, plus health and other benefits. For an application, contact Steffanie Clothier, Regional Coordinator, 1724 Gilpin Street, Denver, CO 80218; (303) 355-1881. The deadline for applications is January 31.



Stan's Advice for the Green Environmental Professional

STAN KISTE IS VICE PRESIDENT of Lubbers Resource Systems, a recycling consulting and disposal company based in Jenison, Michigan. While speaking to a group of college students, he was asked to advise someone considering an environmental career. He didn't have a ready answer, but after a few weeks of mulling it over he jotted down some thoughts. His slightly tongue-in-cheek reply:

1. Leave your tie-dyes and sandals at home.

Too many people perceive environmentalists as flaky, unstable, or just plain weird. You should present yourself in the most professional manner possible. Dress like the CEO of an international corporation and speak in a concise, business-like manner. Refer to current Wall Street trends or the ramifications of an open market in Europe. None of this will change your beliefs, but you will probably baffle those expecting something else—and gain enough respect to accomplish something positive.

2. Remember what you learned in

classes like English Composition, Basic Accounting, and Typing.

Although there's certainly a need for "pure scientists" in the environmental field, you may find yourself overseeing public relations, clerical operations, finance, personnel, education, and equipment maintenance. You'll be especially sorry if you slept through the class that dealt with making a payroll when you have only \$17.32 in your organization's bank account....

3. Marry rich.

In the current job market, it's highly unlikely that you'll make great money as an environmental professional. In fact, it is entirely possible that you'll find it very difficult to support a family on what you earn. Love is nice and all, but if you're really serious about an environmental career, find someone who's got some bucks.

4. Never alter or embellish the facts.

There will always be people who attempt to discredit the environmental movement by exposing environmentalists who sensationalize. In some

professions, dishonesty gets you on the lecture circuit earning \$50,000 a speech, but the environmental profession is not one of them. Besides, the facts are shocking enough. They don't need to be exaggerated.

5. Be prepared for disappointment, frustration, and setbacks.

Conservation and environmental protection are far from universally accepted. Not everyone will agree with what you find logical and proper. It takes great patience to survive as a successful environmental professional. Taking the time to celebrate successes will make the painfully slow fight toward progress easier to take.

6. Anticipate a challenging, exciting, and rewarding career.

Not everyone is lucky enough to have a job where they can accomplish something that they feel is important and right. As an environmental professional, the significance of what you accomplish will easily outweigh the difficulties and frustrations of your task.

— Stan Kiste



For the planet's sake — and for our health — we should probably eat more plants and fewer animals. Leaning toward vegetarian doesn't have to be a religion. Besides, it can taste great!

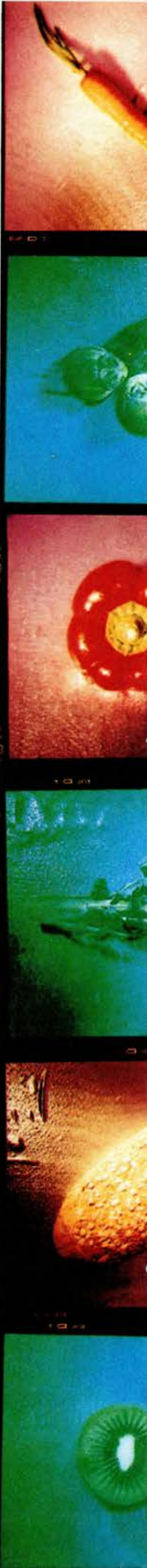
EATING LOW ON THE FOOD CHAIN

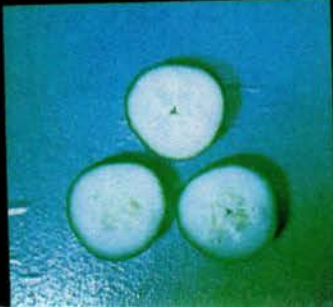
IF YOU'VE READ A NEWSPAPER anytime this decade, you know that a plant-rich diet is better for you than a beef-rich one. Turns out that the prized "marbling" that makes beef tender does rather the opposite to your arteries. Eating high on the food chain is hard on the planet, too. As we've corralled too many critters in too-small spaces, and trucked them food from as much as a thousand miles away, we've built our own version of a food chain — one that's tearing holes in the mesh nature created.

Beef cows are the animal environmentalists love to hate. Perhaps the cow would be less maligned if it were wrecking private, not public, lands. Cattle ranchers (or "welfare ranchers," as they're known by wilderness advocates) now graze their herds over 268 million acres of land that is owned by the people of the United States. This land, controlled mostly by the Bureau of Public Lands and the National Forest Service, is leased to ranchers at garage-sale prices: \$1.97 per month for a cow and calf, when the private-market rate is closer to \$9. Taxpayers spend upward of \$100 million a year to subsidize ranchers who include Getty Oil, Union Oil, Utah Power and Light Company, as well as some individual Captains of Industry.

What do we get for our money? Between 50 and 68 percent of the acreage we lease out is in "unsatisfactory condition" due to abusive grazing practices, according to government surveys. What does that mean? Erosion, for one thing. Especially along creeks and rivers ("riparian habitats"), Bossie's appetite ravages young trees and ground-holding grasses. The vulnerable soil is easily washed away by rain or floods. The particles

BY HANNAH HOLMES *Photography by Sylvia Otte*





settle downstream ("siltation"), burying fish spawning areas and causing hydroelectric dams to age prematurely.

Desertification is another effect.

Cows left too long on a plot of ground will eat the grass so low that its roots can't recover. When rain falls, there is little to hold it so that it can sink into the ground. Thus groundwater stores aren't replenished, and rivers simply disappear. Desert ensues.

Where cows alter the ecosystem, opportunistic plants and animals move in, initiating a shift in the food chain. Prairie dogs, for example, will follow if cows overgraze a patch. They drill leg-breaking holes, and polish off every blade of grass. On the heels of the 'dogs come rattlesnakes, who like 'dog dens. Close behind them are birds of prey. The rabbits and mice who once counted on native grasses and shrubs for cover, run for their lives. The original food chain — a web of plants and animals — is gone. Even grazing is out of the question.

The public ire with overgrazing is summed up by Cathy Carlson, legislative representative for the National Wildlife Federation: "Those lands were set aside by the federal government to support a range of uses that includes recreation and wildlife habitats. It's outrageous that these practices are allowed to continue on our lands."

When cattle are brought off the range at a year old for finishing (they're fed corn for 100 days to fatten them), a new problem arises. What to do with all the cow pies? The cows, jammed together in pens, produce more than the surrounding fields can absorb. "Normally, [ranchers] pile it up until they can spread it — or until it washes away, whichever comes first," jests Lynn Shuyler, who works in the federal Environmental Protection Agency's Chesapeake Bay Program. Even in watertight lagoons, the pies quietly emit globe-warming methane and ammonia to the air.

DIETARY DOS AND DON'TS

The American Dietetic Association has a little advice for people who are kicking the meat habit.

- Do eat a wide variety of all sorts of foods — veggies, fruits, nuts, seeds, grains, legumes, and dairy products.
- Do use whole or unrefined grains, rather than refined ones.
- Do be careful with children's diets — they need extra iron, vitamin D, and energy (calories).
- Don't eat low-nutrient, calorie-dense stuff like sweets and fried foods.
- Do opt for low-fat dairy products.

STRAINING THE GRAIN CHAIN

WHILE THE HOOVES of our other meat sources tread more lightly on the earth, they depend more heavily on an artificial and extremely wasteful food chain. Chicken, turkeys, and pigs generally spend their lives stacked in cages inside barns (enormous metal caverns not to be confused with the red-painted version that holds piles of straw and kitty-cats). Plant products with a low concentration of protein are shipped into these factory farms, and meat with high protein concentration comes out. But much is lost in the process.

The big feed crops in this country are corn, soybeans, oats, barley, and sorghum. Corn, grown primarily for feed, is the largest user of insecticides and herbicides combined in this country, and uses 40 percent of the nation's nitrogen fertilizer, according to "Taking Stock: Animal Farming and the Environment," a recent report from the Worldwatch Institute.

Furthermore, about 15 percent of the feed crops grow on irrigated land, representing a drain on water resources. ("Taking Stock" estimates that meat-eaters should add about 100

litres of water to their daily household usage, to account for raising meat.) If the feed crops grown on one-third of U.S. cropland produce one-third of the erosion, then they are responsible for something like 466 million tons of lost topsoil each year.

And of course, all crops require the faithful attention of gasoline-powered machinery, plus a long ride from the Midwest corn belt to the animal farms. Pork and beef feeds may travel hundreds of miles to be ingested; poultry feeds have to get clear down South. (See Feeding and Fueling Our Food, page 36.)

"The entire American food system is based on fairly long transportation distances," says Alan Durning, co-author of "Taking Stock." "That is certainly less efficient than if we were raising livestock on local resources."

LEAN, MEAN PROTEIN MACHINES?

GROWING ANY PLANT takes an environmental toll, but in exchange, it produces nutrition that could be used to keep people alive and kicking. In reality, all those resources — one-half the continental land-mass, if you count range lands — and all that degradation is expended only to create a new cycle of waste, in which the grains are shoveled into animals.

It would be one thing if animals turned each gram of plant protein into a gram of animal protein, banking it for our future consumption. But a chicken needs to eat 5.5 pounds of protein to make one pound of edible protein; a pig needs 8.3 pounds; and a cow needs 21.4 pounds, according to a 1967 study by the President's Science Advisory Committee.

The protein and nutrients stored in the bones, blood, fat, feathers, and guts aren't wasted — they're rendered (super-cooked) and made into feed for dogs, hogs, and chickens. (There's some closed-loop recycling for ya.) But what happens to the nutrients that aren't turned into meat, fur, or feath-

Cattle ranchers now graze their herds over 268 million acres of land owned by the people of the United States... at garage-sale prices: \$1.97 per month for a cow and calf, when the private-market rate is closer to \$9.

ers? They are, uh, wasted. In fact, laying-hen and broiler manure is so rich in unabsorbed nutrients that it's occasionally used as feed for ruminant animals like cows. But the cost to transport chicken crap to cow country makes land-spreading the more common solution. Seventy percent of the U.S. grain crop goes this route — into an animal, who squanders much of it. Although manure is fine fertilizer, too much of a good thing results in runoff to waterways.

So should we skewer the animals, feed all their corn and soybeans to people, and kiss world hunger goodbye? Unfortunately, hunger is a political rather than agricultural challenge. Nonetheless, there are clear and present environmental benefits to eating non-meat protein ourselves. While the production of food would remain somewhat centralized (and therefore expensive to distribute), at least the energy would be spent getting grains straight to the top of the food chain.

Another benefit would be the liberation of land from plow and cow. According to Dr. Francis Moore Lappé's seminal 1971 book, *Diet for a Small Planet*, an acre taken from beef production can produce 10 to 15 times more protein if it's dedicated to things

like beans, peas, and leafy veggies. Meeting our protein needs with half or one-quarter of the land we use now would open up untold acres for the restoration of a modest food chain that stars the buffalo, whose grazing habits and smaller numbers do less damage — and there would probably be room left over for a few Rhode Island-sized landfills!

EATING HIGH, FEELING LOW

AMERICANS EAT MORE meat than anyone else — 246 pounds a year for every man, woman, and child. Until quite recently, our meaty diet was considered enviable. But even before cholesterol became a household word, people were having second thoughts about the chemicals used to raise meat. (Warning: The word "natural" on meat labels is meaningless. Ignore it.)

As early as 1968 a British study concluded that the practice of mixing small amounts of antibiotics into animal feeds presented a health threat to people. The United States Food and Drug Administration concurred, on the basis that antibiotic-resistant strains of bacteria would result. In 1977, FDA proposed banning tetracy-

clines and penicillins from animal feeds, but Congress interfered, asking for more study, and there the matter uneasily rests. The National Cattlemen's Association has suggested that its members go drug-free, but whether ranchers are complying is unknown. According to the Center for Science in the Public Interest, most poultry and pigs eat "subtherapeutic" doses of antibiotics, which, for reasons unknown, make them grow faster.

The National Academy of Sciences has estimated that 70 people per year may die because of penicillin and tetracycline residues in meat, and the super-bugs they encourage. According to random testing by the U.S. Department of Agriculture (USDA), pork and veal are more likely to contain illegal levels of legal drugs than poultry and beef.

If these over-the-counter drugs make you pause, wait 'til you get a bite of the illegal drugs some ranchers use to fight livestock diseases. Among the illegal goods FDA has detected in recent years are chloramphenicol, carbadox, nitrofurazone, dimetridazole, and ipronidazole, all potentially cancer-causing.

Hormones are another additive to beef about. A tablet is implanted in

FOOD-GROUPS PYRAMID GETS THE POLITICAL AXE

When USDA rearranged this eating advice to form a pyramid, the beef and dairy industries objected loudly and the scheme was shelved.

Fats, Oils, Sweets
Use sparingly

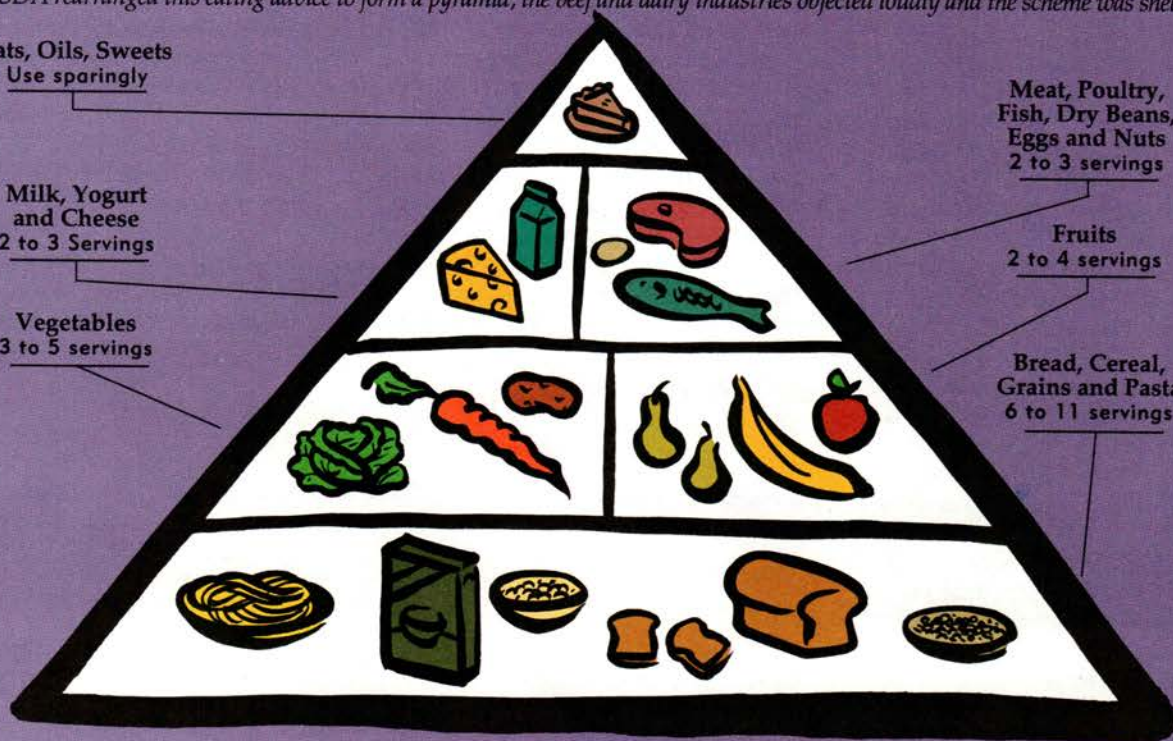
Milk, Yogurt
and Cheese
2 to 3 Servings

Vegetables
3 to 5 servings

Meat, Poultry,
Fish, Dry Beans,
Eggs and Nuts
2 to 3 servings

Fruits
2 to 4 servings

Bread, Cereal,
Grains and Pasta
6 to 11 servings



As the studies pile up, it's beginning to look like he who eats lowest lives longest. Even the American Dietetic Association has tipped its hat to the vegetarian diet.

the ear of about two-thirds of U.S. beef cows so that the hormone (either natural growth hormones we share with animals, or synthetic versions) leaks slowly into the bloodstream. The animal, like the football player on steroids, then has an easier time gaining lean muscle mass. Though damning evidence against hormones is tough to find, the European Community in 1988 announced a ban on U.S. meat raised with hormones.

And don't forget "normal" food poisoning — salmonella now causes upward of 40,000 reported cases a year, and the unreported cases could swell that to 4 million. About one in three chickens is contaminated with the bacterium, which is beginning to show up in eggs.

Salmonella and other bacterial diseases account for about 27 percent of outbreaks of food-related illness. While 9 percent of outbreaks are traced to chemical causes, and 3 percent to viruses and parasites, a whopping 60 percent of food-poisoning outbreaks remain unsolved.

ESCHEWING THE FAT

THE TRADITIONAL FEAR about sitting atop the food chain is that your fat collects the contaminants gathered by those who ate before you. "Lipid soluble" compounds are those that are easily absorbed by fat lipids, and the infamous pesticide DDT is a prime example. Algae absorb stray molecules of this chlorinated hydrocarbon. When small fish eat large numbers of algae, each little load of DDT is stored in the fish's fat. Big fish eat many little fish, and pocket the DDT from each one. Then people or birds eat the big fish, and inherit the accumulated load. And we're stuck with it. Though DDT was banned in 1972, most of us still eat a little bit more every year — along with other possibly carcinogenic pesticides, PCBs, and assorted toxics.

However, it's time to expand our realm of concern. Although it's true

that many contaminants bioaccumulate — gather at the top of the food chain — goodies at the lower end can be contaminated, too. In fact, when the National Research Council in 1987 compiled a list of foods presenting the highest risk of cancer, the tomato — low on the food chain — sat blushing at the top of the list. Beef was second, followed by potatoes, oranges, lettuce, apples, peaches, pork, wheat, soybeans, beans, carrots, chicken, corn, and grapes.

This sort of risk assessment is an imperfect art at best. Notes Lisa Lefferts, staff scientist at the Center for Science in the Public Interest, "Tumors don't come with a little sign that says 'Hi, I'm from the broccoli you've been eating for the last 20 years.'" Dr. Clark Heath of the American Cancer Society estimates that food contamination causes only a tiny percentage of cancer cases nationwide. But the fact that such staples as wheat and potatoes share high risk-ratings bodes badly for the entire food chain. It also suggests that, from a contamination standpoint, you may as well eat meat.

In fact, if you were to abandon meats and eat more grains and veggies, would you eat *more* chemicals? "You'd be ingesting fewer of some and more of others," says Ms. Lefferts. "But we don't think there has to be any tradeoff. We support a tax on pesticides to fund research for reducing and eliminating the use of pesticides." (There's not much mystery to getting

rid of pesticides — just a lot of hard work.) Given the tiny residues on food, she worries less about eating pesticide residues than she does about pesticides' effect on the environment. Organic or sustainably grown foods may slightly improve your diet, but they can profoundly improve the health of the planet.

EATING LOW, LIVING LONG

DESPITE THE FACT that the entire food chain is contaminated with chemicals you might not want to eat, there is a harvest of good reasons to eat low.

The best reason might be your health. As the studies pile up, it's beginning to look like he who eats lowest lives longest. Even the American Dietetic Association — not exactly a paragon of progressive thinking — has tipped its hat to the vegetarian diet. According to the ADA, vegetarians exhibit lower blood pressure, cholesterol, and rate of heart disease, lower occurrence of diabetes, colon cancer, lung cancer, and possibly breast cancer, lower rate of obesity, osteoporosis, kidney stones, gallstones, and diverticular disease. Whew! Of course, it's likely some of these benefits arise from other health-conscious habits (exercising, avoiding cigarettes, alcohol, and caffeine) that many vegetarians adopt.

A fringe benefit of the low lifestyle is a smaller food bill. According to the USDA's most recent analysis of protein sources, eggs are a

FEEDING & FUELING OUR FOOD

Feed and energy needed to make a kilogram of food

Food (per kilogram)	Feed: Grain and Soybeans (kilograms)	Energy: For Farm Equipment, etc. (thousand kilocalories)
Pork	6.9	30
Beef	4.8	17
Chicken	2.8	13
Cheese	3.0	10
Eggs	2.6	10

(Source: Alan Durning and Holly Brough, Worldwatch Institute)

bargain, at 25¢ for 20 grams (about one-third the daily requirement of a 154-pound man). Legumes like lentils, peas, and beans (they were ignored by USDA) tend to be even cheaper than eggs, and rich in protein. White meats follow — whole turkey and chicken, then peanut butter and canned tuna. More costly are pork shoulder, milk, and finally, ground beef, roasts, hot dogs, and steaks.

Environmentally, the benefit of eating low is as simple as eliminating the middlecow — the hunk of flesh that squanders piles of plant nutrients, topsoil, energy, water, and habitat in the process of turning out some nutrition. The middlecow charges a steep environmental mark-up that we can avoid if we process plant nutrients in our own bodies.

HOW LOW CAN YOU GO?

THE REASON MOST people give for eating high is that they think low tastes like — well, not much. Dr. Reed Mangels, nutritionist at the Vegetarian Resource Group, objects. "If you've ever eaten Indian food, you know vegetarian food doesn't have to be bland," she laughs. And with the range of cookbooks available, the claim that "it takes too long" no longer holds water, either. (See *A New World of Cuisine*, right.)

So what are the legitimate limiting factors? People worry most about protein. Although we tend to think of animals as our main source of protein, it's hiding everywhere — the trick is to eat it in a form your body can use. The body can manufacture 14 of the 22 amino acids it needs to make protein. The other eight must come in ready-made, and in proportions that your body can mix and match. "Perfect protein," symbolized by the egg, provides your body with enough of these eight amino acids that all are used and none is wasted.

Most other foods (meats excepted) aren't so well balanced. Kidney beans, for example, are deficient in the amino acids that contain sulfur, and in tryptophan. Rice is low in isoleucine and lysine. Dr. Lappé's big revelation is that when you combine beans and rice, the amino-acid strengths of one make up for the weaknesses of the other, adding up to a very good protein source — what she called "pro-

tein complementarity."

Thus vegetarians survive. Through the millennia, people have lived without meat simply by combining: grains with milk products (pizza, grilled cheese); grains with legumes (corn tortillas and refried beans, split-pea soup and wheat biscuits); and seeds with legumes (falafel).

Although Dr. Lappé originally held that these complementary foods must be eaten in the same meal, she and other nutritionists now believe that as long as you eat a varied diet, over the course of a day the amino acids will find each other. "If you're eating enough to keep your weight, chances are reasonably good that you're getting what you need," says Dr. Mangels.

One exception is iron — many women, vegetarian and carnivorous alike, don't get enough of it. Keep in mind that vitamin C taken with iron-containing foods enhances the absorption of iron; coffee, tea, red wine, whole grains, bran, chocolate, and legumes inhibit it. Another potential pitfall for vegans (vegetarians who avoid dairy products and eggs) is vitamin B-12. Strangely, if we weren't so squeaky clean in our kitchens, microbial colonizers of our foods might produce the vitamin for us — it does in poorer countries. But here, vegans beware.*

Eating at any point on the food chain has an environmental price. Broiling a steak erodes the West, while grilling soybean tofu invites pesticides to foul Midwest groundwater. But if simple is better, then the road to "eating lightly" looks pretty straight. Foods — plant or animal — grown near you require less transportation, refrigeration, and processing. Foods grown organically present less of a pollution threat, and thus dabble more gently in nature's food chain. And foods that take the twisting path through animals are no bargain. 

**If you decide to rely more on plant foods, but still include some meat and fish in your diet, you will only be healthier. Strict vegetarians and especially vegans should stay abreast of nutrition information, because a few deficiencies are common. Subscribe to the magazine Vegetarian Times (see box at right) for reliable nutrition information and tasty, tested recipes, for both lacto-ovo-vegetarians and vegans.*

A NEW WORLD OF CUISINE

Here's a sampling of food books that will make the trip down the chain enlightening, easy, and best of all, supremely edible. Unless noted, books are available in bookstores. Look, too, at Mexican, Indian, Mideastern, Italian, and Chinese cookbooks; these cuisines rely less on meat for protein and flavor.

◆ DIET FOR A SMALL PLANET

Francis Moore Lappé's classic treatise on protein, in its umpteenth reprint. Some recipes.

◆ RECIPES FOR A SMALL PLANET

E. Ewald's companion book to Diet for a Small Planet.

◆ VEGETARIAN EPICURE

◆ VEGETARIAN EPICURE II

Two by Anna Thomas. Ethnic and dinner-party-style recipes that never fail.

◆ LAUREL'S KITCHEN

by Laurel Robertson, Carol Flinders, and Brian Ruppenthal. Many cooks talk about Laurel as though she were a close friend, not a book.

◆ THE ENCHANTED BROCCOLI FOREST

◆ MOOSEWOOD COOKBOOK

◆ STILL LIFE WITH MENU

Three fun cookbooks by Mollie Katzen. Emphasis on easy cooking and great taste.

◆ VEGETARIAN TIMES

A monthly magazine that will keep you abreast of dietary and scientific news, with great recipes. \$24.95/year from Vegetarian Times, P.O. Box 570, Oak Park, IL 60303.

◆ THE BREAD & CIRCUS

WHOLE FOOD BIBLE

by Christopher S. Kilham. Fascinating facts, plus recipes for meat and veggies.

◆ MEATLESS MEALS FOR WORKING PEOPLE, \$6 ppd.

◆ SIMPLY VEGAN: QUICK VEGETARIAN MEALS, \$12 ppd.

◆ **VEGETARIAN JOURNAL**
BI-MONTHLY, useful, scientific, realistic information. \$20/year. All from Vegetarian Resource Group, P.O. Box 1463, Baltimore, MD 21203; (410) 366-VEGE.

UNPLUGGING

ELECT

The thought that our appliances are out to get us is a sobering one. Researchers continue to haggle over the dangers of electromagnetic radiation. In the meantime, we've taken an inventory of the electric-powered gadgets and gizmos that surround us. Every one, of course, is a source of pollution — CO₂ pollution from the power plant that runs them, plus the lifecycle pollution that every product generates when its materials are mined and processed, and when it eventually hits the landfill. And, of course, the "pollution" of electromagnetic fields, which we measure here in a typical suburban house. The Rocky Mountain Institute estimates there are 40 million electric garbage disposals, 80 million hair dryers, and 180 million electric clocks in this country, not to mention all the electric popcorn poppers, can openers, and weed whackers. Do we need them all?

The field strength is measured in milligauss. Some researchers feel more than 1 milligauss is dangerous, others think we needn't worry until the needle hits 2.5 or 3 mg. We used the Schaefer EM1 meter, which measures in ranges rather than specific numbers.

BATHROOM



Next to hair dryer:
ABOVE 10



Electric toothbrush:
7 to 10
Hand toothbrush:
0

Graphics by Scott MacNEILL

FROM MAGNETIC POLLUTION

LIVING ROOM



Stereo amplifier:
5 to 7



TV, at screen:
3.5 to 5
TV, at three feet:
.88 to 1.25

BED ROOM



Electric clock, at one foot:

1.8 to 2.5

Electric clock, at three feet:

.88 to 1.25

Hand-wound clock:

0



Under old electric blanket:

ABOVE 10

Under the cat:

0

KITCHEN



In front of electric stove:

5 to 7

In front of gas stove: **0**



Coffee grinder:

ABOVE 10



Toaster:

1.25 to 1.8

STUDY



Computer, at 12 inches:

2.5 to 3.5

Computer, at 24 inches:

1.25 to 1.8



Near the wall where the
electric feed
comes into the house:

ABOVE 10

OUTDOORS



In the car, at the dashboard:

ABOVE 10

In the car, at the front seat:

3.5 to 5



At the base of some electric
poles:

7 to 10

Beneath wires at transformer
station down the block:

ABOVE 10

At 50 feet away:

1.8 to 2.5

"The EMF intensities reported to cause effects and the photon energy of frequencies in the 0 to 500,000 Hz range are very small. Even if the transduction step were 100 percent efficient, there is insufficient energy to break chemical bonds."

NOT EXACTLY BEDTIME READING. That's an excerpt from a federal report on electromagnetic fields — a report daunting enough to make anyone roll over and play dead. Which is what a lot of folks, from government agencies to journalists, electric utilities, and politicians, have done.

Electromagnetic fields, or EMF, may or may not be linked to cancer, miscarriages, birth defects, and other health problems. What is certain and tangible is the controversy and confusion this very notion has instigated. On one side of the debate are the two "godfathers" of EMF research — Paul Brodeur, who writes for the *New Yorker* and broke the asbestos issue wide open; and Robert Becker, a researcher and doctor. Both have books out on the dangers of 60-Hz fields (for help with jargon, see *Electricity in Plain English*, p. 43). Brodeur's *Currents of Death* takes on power lines, video display terminals (VDTs), and home wiring. Dr. Becker's

something each of us must decide. For those who are prone to panic, we'll explore some reasonable, relatively painless, and inexpensive actions to take around the house.

The powers that be don't think you should bother. With the exception of limits on the field-strength under transmission lines in New York, New Jersey, Montana, Minnesota, North Dakota, Florida, and Oregon, there are no regulatory numbers to look at in the U.S. (Sweden uses 2.5 milligauss as its safety guideline, and Dr. Becker advocates a lower, 1 milligauss limit.) In fact, the U.S. Environmental Protection Agency (EPA) is tying itself in knots as it tries to define the health impacts of EMF. Much dismay accompanied the agency's semantic acrobatics last year in the above-quoted report, "Carcinogenicity of Electromagnetic Fields." At the eleventh hour, wording describing fields as a "probable cause" of cancer was softened to "possible cause."

(At least one staffer has suggested that the agency is suffering from a bout of severe disappointment. For years, EPA has touted the benefits of "clean" electricity — electric cars, mass transit, solar power. Now what if it turns out that electricity isn't so clean after all?)

The utilities are a natural target. Even as they spend huge sums on research, the party line is still: It's too early to worry.

A Gauss in the House

Cross Currents explores electropollution as well as covering the more positive advances in electromedicine. Facing off against the Brodeur/Becker camp are the power companies and government agencies, both hoping like hell the problem will go away, or at least turn out to be a bust.

What raises the stakes of the debate are the awesome implications should there be something to all this. Let's face it, electricity is the glue that holds our daily lives together, powering the water heater, the starter in the car, and the big board at the New York Stock Exchange. Proof that EMF are harmful would profoundly affect the utilities, computer and communications industries, and the military. It all adds up to trillions of dollars worth of GNP, and the spectre of doubled utility bills for the next 20 years, which is why this is a hot topic. And don't think Corporate America is going to foot the bill. The consumer is, which explains why most politicians won't touch the issue with a ten-foot utility pole.

Is the panic attack, instigated by Mr. Brodeur and Dr. Becker, misplaced? Or, given the big, black hole in our knowledge, should we be lobbying our utilities, buying gaussmeters, walking instead of taking the subway, rewiring our homes — changing the way we live?

Given the unsettled state of the science right now, this is

Consumers are responding with a frontal attack, showing their ire by blocking new transmission and distribution lines, demanding changes in existing lines, and generally making life unpleasant for the power giants.

LET'S GET PHYSICAL

THERE IS REASON FOR CAUTION, and reason to stay calm. There is no conclusive proof that magnetic fields cause cancer or other health problems, a fact power companies trumpet every chance they get. There is no dispute, however, that fields affect the body in a myriad of ways. How this occurs is not yet clear. Also murky are the questions of dose (how many gauss are too many); long-term versus short-term exposure; the dangers of brief, intense bursts (like those from a hair dryer a few inches from your head) compared with more prolonged, low-level ones; and the question of how the body's own electrical and magnetic forces interact with outside fields.

The still-disputed link between childhood leukemia and electromagnetic fields was first noticed in two Denver studies in 1979 and 1986. More recently, Dr. John Peters in southern California got similar results: a higher leukemia rate in homes close to high-power distribution lines (those thick wires on top of street poles). Other studies suggest a relationship between VDT





"Proof that EMF are harmful would have awesome implications."

or electric-blanket use and miscarriage and birth defects. In animal studies, scientists have noted numerous physiological responses to EMF, including decreased production of certain hormones, disruptions in sleep cycles, impairment of the immune system, and acceleration in the growth of cancer cells. This hodge-podge of research represents the messy birth of a new field of study.

Though there are now about 160 major studies ongoing worldwide, there are still those who say that's nowhere near enough. The U.S. is currently spending \$10 million on research. A paltry \$5 million of that comes from the federal government, the rest from sources such as the Electric Power Research Institute, a utility group.

DR. JOHNSON'S AMAZING SNAKE OIL

AMERICANS PRIDE THEMSELVES on ingenuity. If there's a problem, we find a solution — or so we think; hence, a host of products to battle the electromagnetic scourge. Some of these are just modern versions of a snake-oil cure-all, worthy of a Monty Python spoof — the pillow that soothes your body's electromagnetic force field while you sleep; the crystal pyramid that eliminates unfriendly fields from its perch atop your computer terminal; the red lapel button that neutralizes the fields around you.

By contrast, there are a number of items appearing that *seem* plausible: a lead apron for pregnant women. A fluorescent-light ballast that eliminates 60-Hz flicker. A videotape that tells you how to make your home safer. But even these merit a once-over.

Read the fine print in those computer-shield ads and you'll note that all the talk is of electric fields, not magnetic ones, which are the focus of health concerns. Louis Slesin, editor of *Microwave*

News, puts it this way: "There's nothing you can buy to put outside your computer that will shield [60-Hz] magnetic fields." (Little is known about the ills, if any, of electric fields.)

Ditto for the apron. Once again, it's effective where electrical fields are concerned, but doesn't repel magnetic fields. There is concern, in fact, that the weight might create yet another hazard for the expectant mother.

The fluorescent-light ballast? Yes, it stops the flicker, but the effect on the EMF is minimal.

The videotape, "Current Switch," is informative on issues such as power lines and home appliances. Where it runs into trouble is when it dabbles in do-it-yourself home wiring, a tricky bit of business best left to an electrician.

As you peruse the mail-order catalogs that peddle this stuff, read carefully. Does the blurb mention only electric fields? Or make vague reference to "radiation"? Magnetic radiation is what we're concerned with. Until consumer publications test these products, consumers are going to have to be their own watchdogs.

WHAT'S WORTH THE BUCKS?

IS THERE ANYTHING money can buy that's worthwhile? This leads back to issues of free will and self-determination. If your anxiety level is reduced by spending some money, there are some reasonable options.

Gaussmeters: Start with a gaussmeter, also known as a magnetic-field meter, or power-frequency meter. This can help you locate the fields that are wafting around your house, your child's school, your office, your car, and the train you take to work. There are several easy-to-use meters on the market right now for under \$200 (see Resources, p.

43). These will measure electromagnetic fields — give or take a few milligauss — as long as you don't live within spitting distance of a radio transmitter, says Edward Mantiply, manager of EPA's electromagnetic-field lab in Las Vegas.

Mr. Mantiply has tested a few dozen single-axis meters in the \$100 to \$150 range, but EPA will not be releasing the results, due to procedural flaws. However, the agency did say that most of the meters, built with a single metal coil inside, perform reasonably well. Here's what to look for:

- A price range of \$100 to \$150.
- A single-axis model. (Cheap multi-axis meters haven't been subjected to even a *flawed* study.)
- A display that reads in milligauss.
- A good manual or guide.
- You might look for the ability to read at 180 Hz as well as the more common 60 Hz, since the former is a common "harmonic" of 60 Hz.

Speaking from experience, this type of gaussmeter is extremely easy to use, which may be one reason EMF are becoming a sexy issue. Anyone can measure them. However, if you get readings that seem high, don't panic unless every other house you can gain access to reads lower — some meters just read high.

Computer Contraptions: Let's say you write for a living and the idea of mothballing the computer and resurrecting the old Royal is enough to bring on writer's block. What are your options?

It's possible — even probable — that simply sitting two or three feet from your monitor will take care of the matter. It won't hurt to get as far from it as your eyes will permit. Barring that, Safe Computing sells a couple of products for both IBM and Macintosh computers that partially or completely eliminate fields (\$295 and \$995, respectively). A cheaper route is to have Safe "retrofit" your existing monitor (\$150 to \$200). If you're in the market for a new machine, Apple and IBM are among the manufacturers who are making models that have lower electromagnetic emissions.

Bedding: If you must have a water bed, you might want to get a new one. Recently, many manufacturers of water-bed heaters have quietly redesigned their products to reduce fields. If electric-blanket makers are making similar reductions, they're keeping quiet about it. (The big exception is Sunbeam, which in late '89 made changes in all its Sunbeam, Slumber Rest, and Odyssey blankets.)

Both water beds and electric blankets

are considered particularly strong sources as they're in close contact with your body for six to 10 hours at a time. Ed Leeper, a Boulder, Colo., physicist, businessman, and co-author of the seminal childhood-leukemia study, points out that even though redesigned bedding shows a sharp reduction of fields, there's not a total elimination. A better alternative may be to heat up the bed, then unplug the blanket before you get in.

Most other appliance-makers haven't plunged into product redesign, taking a "wait and see" attitude. Revamping vacuum cleaners, hair dryers, and razors will ultimately cost the consumer more, hence the foot dragging.

PULL THE PLUGS?

WHICH BRINGS US back to the question of what's reasonable. The term "prudent avoidance" has been bandied about a lot by both researchers and policy makers.

The simplest and cheapest measures you can take require minor lifestyle changes. These include relocating appliances like air conditioners, fans, toasters, and electric clocks. Because the strength of EMF drops rapidly with distance, simply moving these things a few feet


away from where you spend a lot of time will reduce your exposure. You might also try weeding the electric razor, hair dryer, and electric toothbrush out of your bathroom — all produce powerful fields. Keeping tabs on your child's use of video games is a good idea, too.

If you like to see your troubles spelled out, you might buy a gaussmeter. First measure the areas where your family eats, works, and plays: the TV chair, your child's crib, your own bed, your office work-station. As you wander around, you'll play a "warmer-colder" game until you pinpoint which appliances are big electropollutors. You might also take readings from the wiring in the walls. Magnetic fields can leap through walls in a single bound, so be aware that what you're measuring might actually be in the next room.

Try running the gaussmeter with all the house fuses off. If you still get a high reading, you might want to call in a consultant or your local utility. Most utilities have fairly sensitive equipment that can track down the source of a strong field. If the problem lies with the transmission or distribution lines, the utility may be willing to make adjust-

ments. You won't know until you ask.

More thrills and chills are to be had if you take your meter outside and check out the area under the power lines, especially if you've got a step-down transformer nearby (it looks like a gray bucket hung near the top of the pole). Then hop in the car and start the engine, or carry your meter onto the subway. Although not much research has been done in this area, Lynn Gillette, an EPA physicist, reports that when she toted a gaussmeter on her Baltimore-Washington commuter run, she got readings of up to 100 milligauss!

A gaussmeter can give you insight into the mysterious world of electropollution, and might clue you in to the fact that you've got too many household gadgets. But a gaussmeter can't tell you conclusively whether your family is in danger. Until the body of research starts to lean decisively in one direction or another, people who are worried about "a gauss in the house" are going to have to make do with common sense. Unplugging the extras certainly won't hurt you, and if the electropollution scare turns out to be nothing but static, at the very least your contribution to global warming will have dropped ... along with your electric bills. 

ELECTRICITY IN PLAIN ENGLISH

The variety of unintelligible terms makes electricity an intimidating subject — an unfortunate situation, seeing as we're completely surrounded by the stuff. If you have trouble telling your amp from your elbow, read on — and more power to you.

HERTZ: In the U.S., what power plants send out has a frequency of 60 Hertz (or 60 Hz), which means that the current in a circuit reverses direction 60 times each second. Health concerns currently focus on 60-Hz fields; higher frequencies haven't been studied as extensively.

VOLTS: The force that's pushing electrons through your wiring, like the water pressure that keeps water at your tap at all times.

AMPERES: The measure of current. In the plumbing analogy, this would be gallons-per-minute.

WATTS: Voltage x Current. Your electric meter counts watts to determine your energy usage.

RESISTANCE: When electricity enters an appliance, it bangs into some sort of resistance, which turns its kinetic energy to heat or light energy. Your toaster heats up because its special wires create a lot of friction for the electrons.

ELECTRIC FIELD: Wherever current exists in a circuit (or a wire), it generates a charged field that radiates out from the wire.

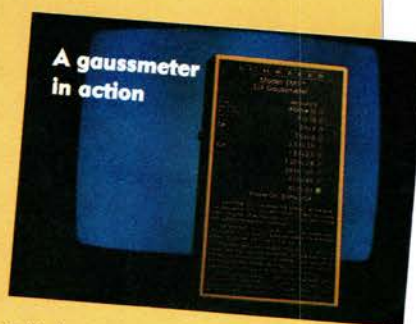
MAGNETIC FIELD: Like an electric field ... but different! For one thing, magnetic fields zip right through metal. For another, they're suspected of causing health problems. Fortunately, like electric fields, their force drops rapidly over distance. Unfortunately, as the current flowing through the wire increases, so does the strength of the field.

ELECTROMAGNETIC FIELD: A handy name for the two combined.

GAUSS: Rhymes with "mouse." Named for a mathematician, it's how magnetic-field strength is measured.

EXTREMELY LOW FREQUENCY (ELF) FIELDS: These days, what people usually mean when they say "electromagnetic fields."

On the spectrum of electromagnetic radiation, the family of extremely-low frequencies (including 60 Hz) is at one end, X-rays at the other. In between are radio, television, and microwave frequencies, and visible light.



RESOURCES

COMPUTERS

- IBM Corp., Route 100, Somers, NY 10589, attn. Paul Snayd; (914) 766-3488.
- Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014; (800) 776-2333.
- Safe Technologies, 145 Rosemary St., Suite F, Needham, MA 02194-3258; (800) 638-9121 or (617) 444-7778.

GAUSSMETERS

- Memtec Corp., 19-B Keewaydin Dr., Salem, NH 03079; (603) 893-8080.
- Schaefer Applied Technology, 200 Milton St., Unit 8R, Dedham, MA 02026-2955; (800) 366-5500.
- Widerange Instruments, 110 Shelter Lagoon, Santa Cruz, CA 95060; (408) 423-1983.

BAUBIOLOGIE HARDWARE

- This mail-order house sells meters, the apron, and the video, among other things. 1199 Forest Ave., Suite 125, Pacific Grove, CA 93950; (800) 441-8971 or (408) 372-8626.

Cynthia Hacinli writes on health and other subjects for Mademoiselle, the New York Times, Gentleman's Quarterly, and the Portland Press Herald.



Business is booming at the Haight-Ashbury Neighborhood Center in San Francisco.

BOTTLE BILLS

Headed for a Collision at Curbside?

BY JOHN GRASSY

HALF TIME! CRUNCH ... SHOT ... SCORE! Another aluminum can lands in the trash. Each day, about 100,000,000 easy-to-recycle aluminum beverage cans head for obscurity in the landfill. Despite the growth of curbside recycling, and the nine state bottle-deposit laws, the national recycling rate for soft-drink containers stands at 52 percent.

Aiming to end this waste of easily recycled materials, federal bottle bills have made the rounds in every Congress since the early '70s. Each time, they gain the undivided attention of the beverage industry, whose well-oiled lobbies have helped bulldoze under hundreds of deposit laws at the local, state, and federal levels, while environmentalists and the litter lobby stand helplessly by.

This year, there's a difference. While the 1991 edition of the national bottle bill (HR 997) collects sponsors, recyclers and community leaders are debating among themselves whether a national bottle bill will help or hinder the nation in meeting its recycling goals. Some factions are hopping over the fence to join forces with the beverage lobby.

Advocates of a national bottle bill believe the goal should be to recover as much aluminum, glass, and PET plastic as possible. Citing evidence from the nine bottle-bill states, they claim curbside and bottle laws are compatible and complementary.

In 1972, Oregon became the first state to put a 5¢ deposit on its soft-drink, beer, and mineral-water containers. The idea was to control

roadside litter by providing an incentive to keep cans inside the car. Eight states followed suit between 1973 and 1983. Now redemption rates top 90 percent in three states, 80 percent in four more. A majority of residents support the bills. Beverage litter is gone. And a respectable five to eight percent of the solid-waste stream (by volume) is recycled.

These reductions in roadside litter and solid waste are valuable. A New York State study projected that each year the state's bottle bill would save \$50 million in litter costs, plus \$19 million in landfill fees. Likewise, Michigan estimated savings of \$37.5 million for one year (1988), due to removal of bottles and cans from the waste stream.

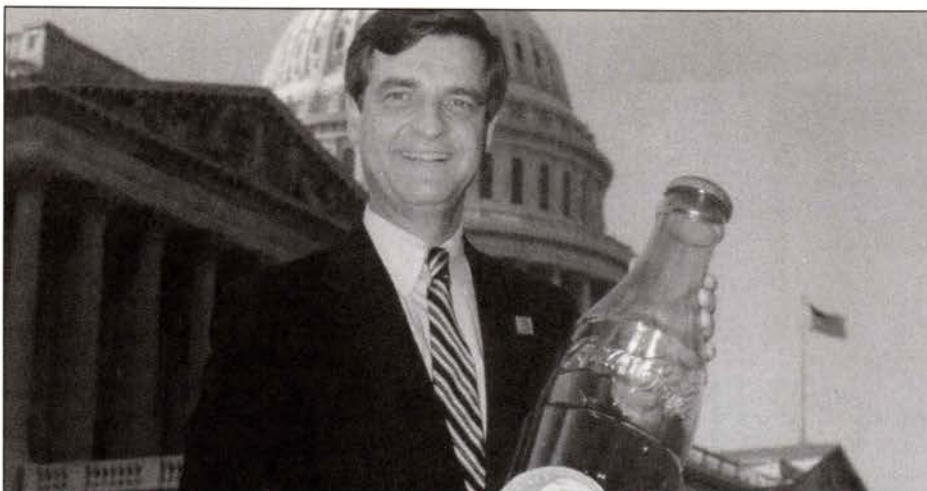
The high recovery rate of clean, pre-sorted material means recyclers in bottle-law states are assured a steady supply of high-quality resources. Some argue that, were it not for the bottle-bill states, we wouldn't have much of a national recycling industry at all. In fact, almost all plastic beverage bottles, most glass ones, and a majority of aluminum cans that are currently recycled come from bottle-bill states, though they comprise just 18 percent of the population.

"There's a market out there for these materials, and we ought to feed that market," says Robert Filka, a legislative aide to the national bill's current sponsor, Rep. Paul Henry (R-MI). "The best thing for market development is to focus on each material group, and devise the best collection mechanism for that material."

NOT BUBBLING WITH ENTHUSIASM

THE BEVERAGE INDUSTRY is not toasting Paul Henry. In bottle-bill states, beverage distributors must turn a one-way delivery system into a round-trip pick-up service. When that truckload of the Real Thing is delivered to the grocer, there are a few thousand loosely bagged empties waiting to be hauled off. To accommodate them, distributors buy more and bigger trucks — they claim fuel consumption

PHOTOGRAPHY BY MARCO MICHELETTI



“The best way to protect curbside recycling in this country is to improve the paper-recycling market, not to fend off a national deposit law.”

— Congressman Paul Henry,
sponsor of the national bottle bill.

rose in Michigan by 32 percent for soft-drink distributors, and 25 percent for beer distributors during the first year of the bottle law. Additional complaints are that extra warehouse space is often needed to process bottles and cans, and for both grocers and distributors, labor costs rise.

The most common threat consumers hear is that the price of beverages will rise with the advent of a bottle bill, and sales will plummet. In every bottle-bill state, beer and soft-drink sales did indeed drop during the first year of the deposit law. Although consumption rates tend to return to normal, distributors and retailers can lose millions during the transition. The National Soft Drink Association (NSDA) is portending \$2 billion (yes, billion) in lost sales under a national bill.

“Look at it logically and you’ll see that bottle bills are narrowly focused, high cost, and detrimental to the real solution, which is drop-off programs,”

says Robert McKinney, who monitors state and local issues at NSDA. The soft-drink biz, with estimated retail sales of \$47 billion in 1990, says soft drinkers would face price increases of about \$18 per year under the national bottle bill. State-sponsored studies tend to bear this out.

However, in two states, this \$17- or \$18-per-capita investment has yielded roadways virtually free of littered beverage containers — Michigan’s return rate is 93 percent, Oregon’s is 97 percent. It also reduced the waste stream five to eight percent, and saved landfill and litter costs. Public approval in both states is 90 percent.

COLLISION AT CURBSIDE

THE NEWEST ARGUMENT, however, rages over a bottle bill’s impact on comprehensive recycling. Opponents are having a field day scaring off supporters with a simplistic battle cry:

“It’ll destroy curbside!”

At the moment, beverage containers are the most valuable component of the waste stream. Every bottle and can returned to the store is nourishment snatched from the mouth of the curbside bin, the argument goes. Deprived of this rich revenue source, curbside programs will be pushed to the limits of cost-effectiveness; some may go under, others may stop accepting materials with little or no market value, such as newspaper, in order to compensate for the lost income.

The mere prospect of curbside programs drying up could ultimately decide the bill’s fate. In reality, it appears the effects would vary considerably from one program to the next.

The curbside program of Anne Arundel County, Maryland, offsets 12 percent of its operating costs through beverage-container sales. “I’d say that if we had a deposit law tomorrow, we wouldn’t stop [recycling], but our balance sheets would look a lot worse,” says Amy Burdick, manager of the program. A solid financial base and strong commitment to recycling by county government will ensure this program’s survival, she says.

Seattle recently calculated the effect of a national bill on its famous curbside programs, and concluded that recycling would continue unharmed. A bottle bill would cause a 46 percent decline in revenue from the sale of curbside materials. But that decline would be more than offset by savings in collection and disposal costs.

“The city would be able to compensate curbside recyclers for lost revenue and still continue the program,” says Solid Waste Utility Director Diana Gale.

For some programs, the lost bottles and cans could mean higher fees for residents. During its pilot year in 1990, Albuquerque, N.M., made 40 percent of its scrap revenue from beverage containers. Without that income, says Recycling Coordinator Gene Grabtree, monthly curbside costs for residents would jump from \$1.60 to about \$2.50. And yes — that would discourage participation, he says.

Bottle-bill supporters are weary of bearing the burden for the success or failure of curbside recycling. “The best way to protect curbside recycling in this country is to improve the paper-recycling market, not to fend off a national deposit law,” says Congressman Paul Henry.

Could deposit laws and curbside programs *together* be more comprehensive than so-called comprehensive recycling? Curbside serves 15 percent of the population, and is growing, but it's not likely it will ever serve the entire country, particularly rural areas. Furthermore, an estimated 25 percent of all soft drinks are consumed away from home — and therefore the recycling bin. So what can we expect from curbside? Ms. Gale says metropolitan Seattle could reach a 70-percent recovery rate for aluminum, but not for plastic or glass. Even one of the nation's finest recycling programs can't pull 'em in like a dime deposit can. (If the purchaser isn't moved to return the bottle, the dime still motivates children, underemployed adults, and others to turn it in — a recycling booster that does not occur in curbside programs.)

States that already have both systems think the prediction of a curbside collision is overblown. The recycling programs in those states never formed an addiction to the aluminum revenues, and so they don't miss them. Nor do they miss the plastic, which is costly to collect. Martin Seamen, who operates a curbside program in Ann Arbor, Mich., says his program could never remove the eight or nine percent of the waste stream that the state's 10¢ deposit law does. "Does the bottle law work? The answer is just so obviously yes," he says.

WHADDYA WANT?

THERE APPEARS TO BE no right or wrong answer to the bottle-bill debate — just a series of choices that reflect our personal desires. What *do* we want?

A recent survey by the federal General Accounting Office found 44 percent of citizens surveyed strongly supported a national deposit law, with another 26 percent saying they would "somewhat support" the idea. Did the GAO think to ask those people how they felt about curbside recycling? Uh, no. But in Islip, New York, a town with curbside *and* a deposit law, residents were asked to choose from two options: maintain both the deposit and curbside, or eliminate the deposit in favor of total recycling. The result was nearly an even split: 51 percent said keep both, 49 percent said kill the bill.

FOLLOW THE NICKEL

Unclaimed deposits are a gold mine


DEPOSIT SYSTEMS ARE A FRONT-END tax on the cost of recycling, shared by the parties who produce, distribute, and consume beverages. Beverage distributors initiate the deposit, collecting it from your grocer when they deliver beer and soda. The grocer takes your nickel (or dime) when you buy a soda, and reimburses you when you return the bottle. The grocer gets his nickel when the distributor picks up the empties. However, if you don't return the bottle, the distributor doesn't have to return the grocer's nickel (the grocer keeps the one you gave him, and comes out even). This is how it works in most bottle-bill states. The unclaimed deposits stack up in the hands of distributors, who say they need them to pay for handling.

Tough luck, says Michigan, which has decided the state will help itself to 75 percent of the unclaimed deposits. It plans to use the nickels for its own little Superfund program to clean up hazardous-waste sites. The future of the law is uncertain — the beverage retailers aren't anxious to part with the estimated \$34 million a year, and are tying up the state in court.

The current national bottle-bill proposal would be even stricter, snatching away every unclaimed nickel "to carry out pollution prevention and recycling programs of the Environmental Protection Agency." If 20 percent of deposits went unclaimed nationwide, the kitty would be \$1.2 billion a year. Should states set up their own bottle bills, under the federal bill they would be allowed to keep the cash.

Clearly what's missing is agreement on our goals. Do we want to recover all the beverage containers possible? If that's the goal, the evidence suggests a combination of curbside and bottle bill may be the answer. But we would have to agree that the benefits justify inflicting a degree of hardship on curbside recycling (not to mention the beverage industry), and we would have to agree to pay for it. If we make it our goal to promote the development of curbside alone, we would do it knowing that a large number of beverage containers will always slip away. We would have to agree that

the cost of recovering those containers was greater than the benefits — cleaner roadsides and lower landfill bills.

HR 997 may get a vote before the end of 1992. It would require states to achieve a 70-percent redemption rate, or submit to federal regulations establishing a 10¢ deposit. If it doesn't float this time, history suggests supporters will be raising a glass to its return next year. 

John Grassy wrote about recycling motor oil in GARBAGE, July/August 1991. He is an editor at Falcon Press in Helena, Montana.

"Look at it logically and you'll see that bottle bills are narrowly focused, high cost, and detrimental to the real solution, which is drop-off programs."

— Robert McKinney,
National Soft Drink Association

By Robert Kourik

AS THE

The gates on many U.S. landfills are clanging shut! In more cities every month, it's a violation to trash wet, biodegradable kitchen scraps. You may even be fined! What's a law-abiding citizen to do? Enter that intrepid traveler of dank places. That prodigious consumer of soil and vegetable scraps. A wonder of invertebrate evolution to some, a conjurer of nightmares to others. Dear reader, I offer for your consideration the sometimes maligned, often misunderstood, but always energetic: WORM.

While not the answer to all our kitchen-composting needs, the lowly worm is a wondrous digester of food leftovers. Consider its appetite. About as close to all mouth and gut as a critter can get, each day a worm eats half its weight in food.

Certain worms can be cultivated easily in small contain-

are living critters, and their creature comforts require some attention. Believe me — I've made some regrettable mistakes.

GARBAGE sent me to the grounds of the posh Bel-Air Hotel in Beverly Hills, California, for a secret meeting with Mr. and Ms. Worm — actually one worm, since a worm has both male and female reproductive organs.

RK: Excuse me for the interspecies chauvinism, but all you worms look alike...

M&M W: To you, maybe a worm is a worm is a worm ... but we've got more than 3,000 species. Luckily, a few *Homo sapiens* taxonomists came up with Latin names for each species.

RK: And which one eats our garbage?

M&M W: That's my cousin *Eisenia fetida*, who thrives in worm bins. There are all kinds of common names for *Eisenia feti-*

WORM

ers called worm bins. Bacteria and worms inhabiting a worm bin digest kitchen scraps in a process called "vermicomposting." A 12-inch-deep box measuring 12 inches by 16 inches is all that's needed to decompose the day's kitchen scraps from two adults.

Worm bins should be kept sheltered and near the kitchen for year-round vermicomposting. (Some folks manage their worm bin carefully enough to have it *in* the kitchen.) A properly maintained worm bin produces a subtle, earthy smell — but no flies. If kept above 55 degrees F. in the winter and below 84 degrees in the summer, worms will transform your biodegradable kitchen waste into a rich plant fertilizer called "castings" (worm feces).

The care and feeding of worms take far less effort than maintaining a compost pile. And worms can digest garbage faster than any other type of composting method. However, worms

da: redworm, red wiggler, brandling worm, manure worm, fish worm, dung worm, English red worm, striped worm, and tiger worm. I call them all "Garbagemouth."

Us earthworms are in a different group. We're known as "Lumbies" (*Lumbricus terrestris*). Lumbies eat dirt, not kitchen scraps. We're here for the interview because the Bel-Air Hotel doesn't compost any of its food scraps, so there's no safe environment for cousin Garbagemouth.

Another family member, *Lumbricus rubellus* or "Rubie," is also called a redworm, and is often used in worm bins on the West Coast, especially here in California. Rubies are true earthworms which live in the soil, but can be raised in bins, even though they don't like it as much as Garbagemouth.

RK: I've heard you guys engage in some pretty kinky sex. What's the scoop?

M&M W: It is *not* kinky, it's quick and efficient. After all,

TURNS

Photography by Steven R. Nickerson



Mary Appelhof, the
'Worm Woman' of
Kalamazoo, Michigan.

eight Eisenias can make 1,500 babies in just six months. We don't have time for long, drawn-out courtin'.

RK: Interesting. What exactly does *Eisenia fetida*, aka the red worm, like to eat?

M&M W: Us Lumbies find their eating habits rather repugnant. They'll slime their way through piles of kitchen garbage without a second thought. It's easier to list what they *won't* eat: bones and non-biodegradable trash.

RK: What are worms afraid of?

M&M W: If a worm bin is too wet, Garbagemouth can die from lack of oxygen. They're also afraid of carnivorous centipedes, which sometimes colonize worm bins. Humans hate it when their worm bins get maggots from house flies or fruit flies, but Garbagemouth doesn't mind — except for the competition for food. All worms quickly burrow downwards at the first glint of sunlight. And we hate high temperatures. For Garbagemouth, temperatures above 84 degrees F. are disabling or fatal.

RK: Well, thanks for your time, and happy burrowing! I'm going fishing — with artificial lures, of course.

SIZING A WORM BIN

MARY APPELHOF, A resident of Kalamazoo, Michigan, is the undisputed, nationally recognized "worm woman." Her book *Worms Eat My Garbage* (Flower Press, 1982) is the bible for wormophiles. What follows is a synopsis of her detailed text, combined with information gleaned from a recent telephone interview, supplemented with my own experience.

To determine your worm bin's optimum size, survey the amount of food scraps you actually generate. Mary recommends that you collect your daily scraps, weigh them, and calculate an average for the total number of pounds

produced per week. Each square foot of the surface area of a worm bin, assuming a healthy population of writhing worms, will digest one pound of kitchen scraps per week. (To ensure sufficient oxygen, all bins should be between 12 and 18 inches deep.)

For garbage-squeamish folks, there's a simpler way to size a worm bin: Use the experience of veteran vermicomposters. Ready-to-use worm bins are available through mail-order companies. Mary offers her own version, the "Worm-a-way" indoor vermicomposter (see *Unearthing Worms* — by Mail, p. 51).

"Worm-a-ways" range from one- and two-person bins with a surface area of 12 by 16 inches to a 21-by-31-inch bin that's big enough for more than four people.

Whether you buy or build a worm bin, consider getting one that's one size too big for your daily needs. That way, the worms will be able to handle the waste onslaught generated by your bowling team's barbecue.

BUILDING A WORM BIN

THE REQUIREMENTS FOR a good worm house are moist but not wet bedding; plenty of air, but not so much that the worms dry out; a cool (but not cold) temperature; and an insect- and critter-resistant lid. Avid wormologists use



Mary's worm bin, wrapped in bales of straw, keeps worms cozy when it's cold. Inside, worms bed down with their favorite paper: *The Wall Street Journal*.

everything from old metal drums to wooden boxes and plastic buckets.

When choosing a worm house, remember that the combination of darkness, wet food scraps, and condensation can generate more moisture than you'd ever imagine. Metal or plastic containers with a closed bottom will often accumulate so much moisture that you may find drowned worms — not a pretty picture. To drain surplus liquid, punch holes into the bottom of the container. (Of course, a bin with drain holes is appropriate only for the outdoors.) Wooden worm boxes avoid moisture overload "because the wood soaks up the moisture and wicks it away from the bedding," explains Mary.

Two things to remember: If the container is deeper than 18 inches, worms will simply colonize the upper layer, where they find the best mix of oxygen, moisture, and food. Also, a shady, cool spot in the summer and a warm place in the winter are essential if you want to prevent mass wormicide.

BEDDING YOUR WORMS

YOU CAN'T THROW a pile of worms in a box and get good results. A worm needs good bedding (the medium where it mates and eats), which keeps its habitat aerobic (full of oxygen) and well drained. Choice material for bedding includes peat moss or shredded cardboard and newspaper. Mary recommends ten pounds of shredded paper for a bin with six square feet of

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GUT AS A CRITTER CAN GET, THE
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surface area. When in doubt, just fill the bin with snugly-packed bedding. The worms will naturally colonize the amount of bedding they need.

"Worms are 75 to 90 percent moisture, so their bedding should be about 75 percent moist," suggests Mary. Her formula for moistening shredded paper is to add three pounds of water for every pound of paper (one gallon of water weighs just over eight pounds). To do this, pack your bin with shredded bedding, then remove the bedding and weigh it. Put the paper into a large bucket, add the proper amount of water, soak the paper until the water is absorbed, then place it into the worm bin. (Once you're a veteran vermicomposter, experience will show you the right moisture level.)

Most kitchen wastes are very moist. The gradual decomposition of the waste adds moisture to your bin. So keep adding bedding to maintain a moist, but not wet

mendations, or even laws, against adding meat and fish scraps to worm bins. Town officials worry that if the bins are mismanaged the scraps will attract flies and rats, and they may start to stink. Actually, worms love the high nitrogen content of meat and fish scraps, which they can rapidly digest. My own worm bin has received the bony detritus of countless barbecues. While worms don't eat the hard bone itself, all leftover flesh quickly disappears. (When the worms have finished feasting, just remove the bones by sifting the finished castings before using them in the garden.) Carnivorous critters can be kept out of your worm bin if it's tightly sealed with a proper latch. Well-ventilated bedding eliminates odors.

Regardless of what you're feeding your worms, there are two ways to add the waste. The easiest is to simply apply the scraps in a thin layer on top of the bedding. This means the worms have to

crawl up onto the new scraps — no problem if the bin is kept dark with a solid lid. To make the worms work even faster, use a garden trowel to open up a small cavity and bury the day's kitchen waste. Be sure to add each day's scraps to a different part of the bin.

USING YOUR BLACK GOLD

AFTER ABOUT four months, your industrious worms will have digested much of their bedding, leaving behind a deposit of rich castings. Worm feces are full of phosphorous, nitrogen, and other min-

erals and nutrients. In a worm bin, the castings are mixed with the compost of decomposed kitchen wastes, bedding, and dead worms. Any self-respecting gardener recognizes this as horticultural black gold — virtually unsurpassed as a natural fertilizer.

To harvest your black gold, simply push all the decomposed material (it looks, feels, and smells like soil) over to one side of the bin. Add fresh, moist bedding to the remaining space, plus

kitchen waste. Then wait. After a few days, the hungry little worms will migrate over to the new feeding grounds — and you've got a worm-free pile of vermicompost.

You can use the vermicompost anywhere in your house and garden. With houseplants, add a thin layer to the top of the potting soil. With each subsequent watering, some of the nutrients will be washed into the soil. Mixing the fertilizer directly into the soil's surface, or throughout the potting mix when repotting, is an even better use of this valuable resource.

When using vermicompost in the garden, carefully work it into the ground around the perimeter of the foliage, where there's plenty of feeding roots. No garden or houseplants? Bag up your black gold and use it as gifts for your gardener friends — they'll love you forever. (If they don't appreciate the gesture, send it to me!)



Every day, a worm eats half its weight in food, leaving behind a pile of rich castings—a great fertilizer for your garden.

environment. If the bin starts to develop too much condensation, you'll whiff a few strange odors. Snuff them by adding shredded newspaper.

Now it's move-in day — time to add a pound of hungry worms capable of devouring up to 3.5 pounds of kitchen scraps every week.

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Gardener's Supply Co.

128 Intervale Road
Burlington, VT 05401
(800) 955-3370

Their catalog lists worms for \$24.90 ppd. They also offer a pre-made plastic worm bin with worms and Worms Eat My Garbage for \$77.90 ppd.

Smith and Hawken

25 Corte Madera
Mill Valley, CA 94941
(415) 383-2000

They sell worms in one-quarter-pound and one-pound increments for \$15 and \$35 ppd.

Worm's Way

3151 South Highway 446
Bloomington, ID 47401
(800) 274-9676

They list the Worm-a-way Indoor Composter at \$81 ppd.

Also, check your telephone directory's Yellow Pages under the heading "Worms" for the address of the "worm farm" nearest you. Remember, some of the worms raised for fishing are not the ideal species for cultivating in closed-bottom bins. Ask your local worm farmer to identify the species he's raising.

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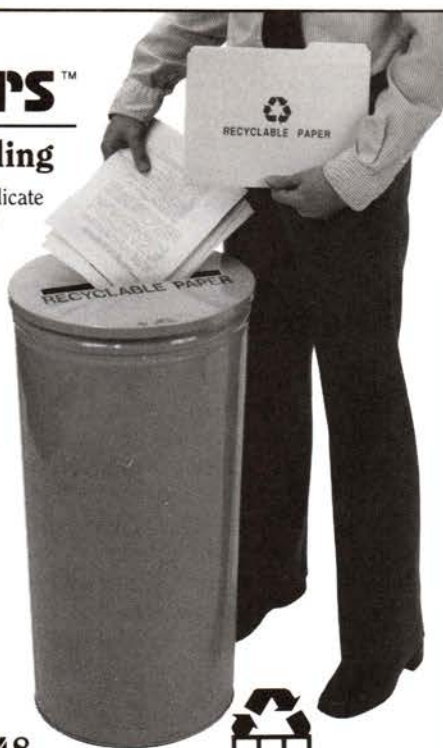


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Low Cost: Precious Earth's canvas bag gets the job done with a Velcro rollover handle and your choice of logo. Product #X174-2760 is "I'm saving a tree." #174-2762 is "Save the Earth." About \$7.50. (Call for exact postage). Demco, P.O. Box 7488, Dept. GM, Madison, WI 53707-7488; (800) 356-1200.

High Tech: The Cool Tote is insulated like a sleeping bag, and comes with a freezer pack that keeps your chow cold. Velcro closure, long handle. #TB204, specify black, blue/red/white, or turquoise/fuchsia. \$16.95. One Earth, 55 Bridge St., Dept. GM, Frenchtown, NJ 08825; (800) 253-0653.

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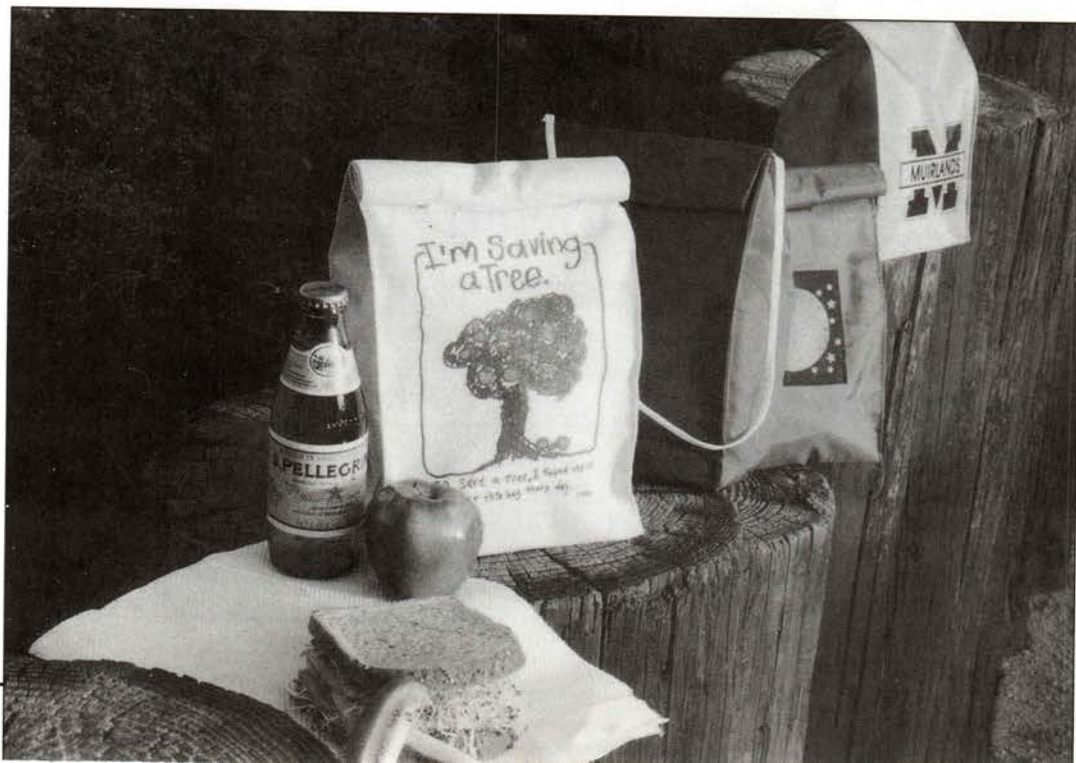
High Style: Real Goods' blue and green nylon sack sports a bright globe surrounded by gold stars. Velcro rollover handle. #51-221, \$11.50. Real Goods, 966 Mazzoni St., Dept. GM, Ukiah, CA 95482; (800) 762-7325.

Bright Idea: Naturesaver is a bag-colored nylon bag that can be custom printed and used in fundraising efforts (at least one school in the nation has banned paper lunch bags). You provide the design (a school logo or nature emblem), and for \$4.50 per bag plus shipping and a \$30 screen set-up fee, you get bags. Velcro rollover handle. Naturesaver, P.O. Box 457, Dept. GM, La Jolla, CA 92038; (619) 459-7819.

Recycled Wallpaper

After looking into recycled and low-toxicity wall boards (Keepers, Nov/Dec 1991), I came across another great home-finishing item. CoverAge is a textured wallpaper that's meant to be painted, and it's made primarily from recycled paper and wood chips.

The texture is pleasant — almost like old plaster. Sandwiched between layers of white paper are uniform chunks of sawdust, resulting in a random, nubby effect that can be enhanced with paint. The paper is made from



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Wise Words for the Wall

I've been keeping a vigil for children's resources that don't blame the world's ills on aerosol cans and "styrofoam" (the brand name of an insulating product).

This poster, "Something's got to give," spares these scapegoats, and focuses instead on the sheer mass of stuff we consume. It's a fun, brass-tacks look at our lifestyle, with an emphasis on how we can change our habits. The centerpiece of the poster is a seesaw with a child on one end and a mound of consumables on the other. The seesaw itself is composed of a partial list of what one person consumes in 20 years. (Three cars, 20,000 gallons of gas, 2,000 pounds of beef, five telephones, eight garbage cans, two electric mixers, two ironing boards, three televisions, four shower curtains, and much, much more.) As you glance back at the illustration, the discarded bicycle, old carpet, and winter coats start to look familiar.

The rest of the poster presents five solutions, colorfully illustrated: Give it a second thought (reduce); Give it a second life (reuse); Give it up (reduce); Give it away (reuse); Give it back (recycle).

The informational panels on the poster's back are designed to be photocopied to make a booklet. This is a great classroom resource, and it's almost free!

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BOOKS

Practical Home Energy Savings

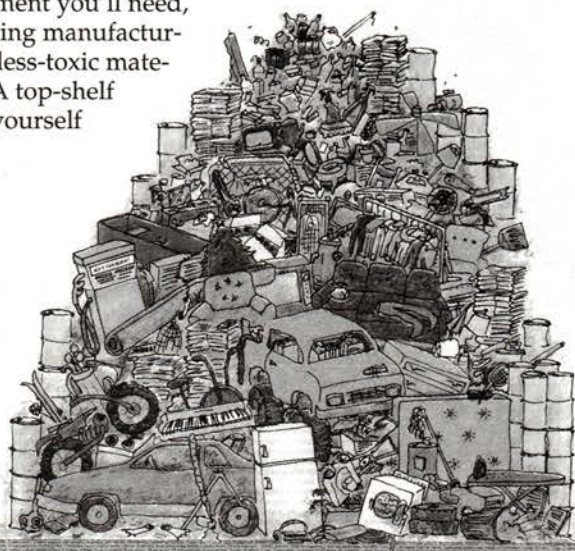
by David Bill and the Rocky Mountain Institute. 47 pages. Rocky Mountain Institute, 1739 Snowmass Creek Rd., Snowmass, CO 81654. Softcover, \$8 ppd.

Since reading this book, I can hardly wait to dive into our gritty cellar with my very own caulking gun. It's the tone more than anything that makes it a must for anyone who pays a heating or electric bill, including renters. The book is easy-going, it assumes a healthy IQ, and it's funny. In the words of the authors, "It includes projects for those proficient with a soldering torch, and suggestions for those of you who feel more comfortable with a telephone."

Myself, I'm going to start on page one and complete every project in the book. I'll start by taking stock of utility bills, appliances, and "holes a cat could crawl through." Then I'll go through the draft checklist, weather-stripping doors, puttying windows, caulking around pipes, wires, chimneys, and assorted other leaks. Then it'll be time to look at insulation, indoor-air quality, wasted water, hot water, windows, the furnace, the appliances, and lighting. Each section presents a checklist of chores and a list of sources for the equipment you'll need, including manufacturers of less-toxic materials. A top-shelf do-it-yourself book.



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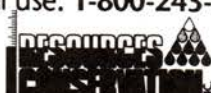
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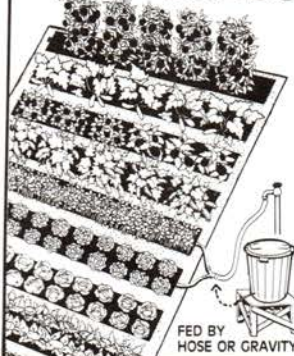
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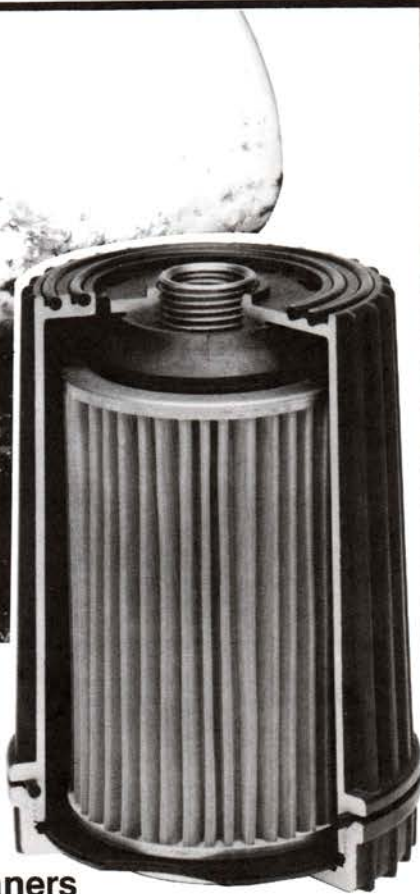
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Frank talk about pet poop; Reducing bulk-mail waste; The perils of ammonia.

Q We are two really large dogs who wonder: How should our environmentally aware human companion get rid of our poop?

Garrett & Jethro Gunderson
So. San Francisco, Calif.

A Having recently acquired a Labrador retriever puppy, in addition to the grown Lab we've already got, plus the cats, this household is heavily into disposal-research mode. We've found that after you've scooped up all those little poop mountains in the backyard, you can go three routes: sewer (by way of the toilet), septic (by special arrangement), or sayonara (to the landfill).

Flushing it down the toilet is the most sanitary way to go. All feces, particularly predator poop, can harbor a variety of parasites and microorganisms that can be quite unfriendly to unwary humans who touch them. Liquid-sewage systems are set up to treat mammal-waste products. For our three-month-old puppy, the sewer method works great. But if the dogs are "really large," like you guys, then toilets are clearly not an option. Discriminating jumbo ca-

nines prefer the septic solution. The current unit of choice is Doggie Dooley. It's a plastic cylinder, open at the bottom and topped with a foot-operated lid, which encases a tank. The unit fits into a hole that's 15 inches across by about two feet deep, layered on the bottom with a few inches of gravel. The poop goes into the tank, along with a bit of enzyme digester powder (for chomping bacteria) and four gallons of water. As the waste is digested, it overflows into the gravel below. A few quarts of water a week are needed to keep the flow going, along with a teaspoon or two of enzyme powder. The digested refuse is (it's hoped) filtered naturally by the soil before it reaches the water table.

Doggie Dooley may not be an option in soggy areas — there's no place to drain if the unit backs up. Also, cold climates are not ideal for a dog-poop digester: The enzyme process stops when the temperature stays below 40°F. The unit is made from a pliable plastic which is great for adapting to ground swells. But it's extremely yucky if you step on the foot-operated lid too hard and fall through, as I did!

Doggie Dooley is available at larger pet stores. To order, contact the manufacturer, Hueter Toledo, at 605 E. Center St., Bellevue, OH 44811; (800) 537-1601. Doggie Dooley Series 2000 (good for up to two large dogs) is \$47.95; Series 3000 (a three-to-six dogger) is \$68.95. Prices include postage and handling.

Check with your local sanitation department to see if your state lets you say say-

onara to pet poop by sending it to the landfill. Tubular bags from newspapers and loaves of bread, made of a plastic that's not commonly recycled, are good for wrapping the stinky stuff. The bags also keep microbes from easily escaping into the landfill, and they give the stuff more time to mellow. (In Canada, pet waste must be double bagged before disposal.)

As for *composting* dog-doo, it's a big no-no. Keep the stuff away from all drinking-water sources and garden areas for edible plants. The reason? Pet-poop diseases, like those outlined in the March/April '91 edition of Ask Garbage.

Q If it's true, as GARBAGE Publisher Patricia Poore maintains, that bulk or "junk" mail is a necessity, what can senders do to make less waste? As a letter carrier, I know that simply adding the phrase "or current resident" below the name cuts down on returns to the post office — where junk mail is rarely recycled.

Gretchen M. French
Desert Hot Springs, Calif.

A The U.S. Postal Service refers to the so-called junk-mail category as third-class bulk-business mail. Bulk mail includes printed material or packages under 16 ounces, delivered to the post office in lots of over 200 pieces or 50 pounds at a time.

To make less waste, senders should fine-tune those mailing lists. The



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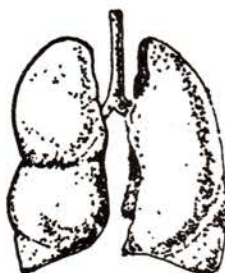
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The return address on a mailing should include an endorsement such as "forwarding postage guaranteed," which sends it to the new address. Or add "address correction requested," which ensures that the mailing will be returned to the sender for updating. Both services entail small fees.

These and other ways to reduce bulk-mail waste are outlined in the booklet *Five Creative Ways to Save Time and Money on Your Business Mail*. For a free copy, send a postcard with your address to Marketing Department, U.S. Postal Service, P.O. Box 7997, Mt. Prospect, IL 60056-7997.

For those of you on the receiving end of unwanted bulk mail, you can ask to be removed from mailing lists by writing the Mail Preference Service, Direct Marketing Association, 11 W. 42nd St., P.O. Box 3861, New York, NY 10163-3861. Include all variations of your name, and ask to have temporary or summer addresses removed as well. When you get unwanted mail, recycle it with mixed paper when possible.

Q I thought ammonia was one of the good old-fashioned cleaning chemicals, like baking soda. Why do household-waste managers seem so down on it? And how should I get rid of it?

Sally Cox
Brooklyn, N.Y.

A Among household chemicals, ammonia is termed by the EPA as toxic — meaning it causes serious health problems if ingested. It's also corrosive, capable

of damaging flesh and even metals. (Pour some on aluminum and see for yourself.) Ammonia is corrosive because it's a strong base, or alkali.

Gentle but still-effective alkali-based cleaners include sodium bicarbonate, or baking soda; and borax, a naturally occurring mineral of hydrogen, oxygen, sodium, and boron. For a brochure on household uses for baking soda, call Arm & Hammer at (800) 524-1328; in New Jersey dial (800) 624-2889. For info on borax, call the folks from 20 Mule Team Borax at (800) 457-8739.

Ammonia reacts vigorously with acid-base cleaners, which can range from mild but effective household substances like vinegar and lemon juice to chlorine for water purification. Pour strong vinegar over baking soda in a backed-up drain and watch the molecular reactions dissolve the clog. But expose a much stronger acid like chlorine to a potent base such as ammonia, and the resulting fumes can severely irritate your lungs.

Dispose of excess ammonia by pouring it down the drain — the sewage system will quickly neutralize it. If accidentally swallowed, *do not* induce vomiting. Digestive-system acids will mix with ammonia to create a substance strong enough to irreparably strip the lining of your throat and esophagus. Instead, doctors advise that you drink massive amounts of water or milk, go to the hospital, and hope your intestines can withstand the stuff.

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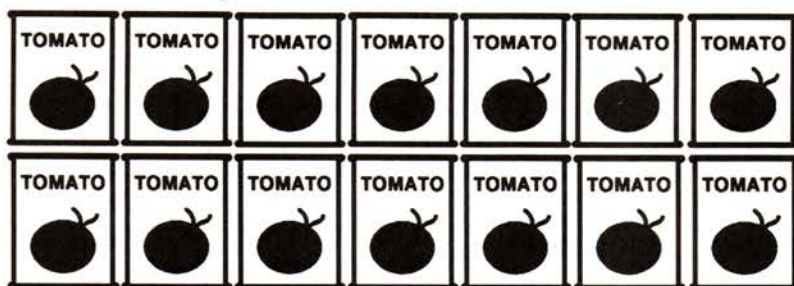
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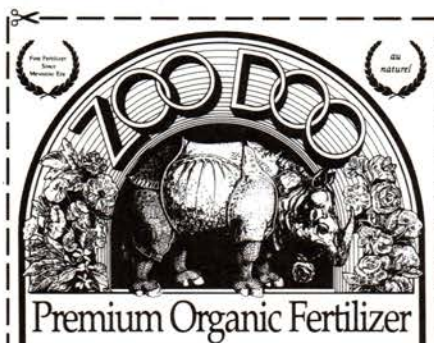
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The Toxic Crusaders give kids slap 'n slamming fun. But where's the environmental message?

MARK WAREK

Head-Bangin' Ecology

HERE'S A PRETTY familiar plot: A fictional toxic-waste spill turns a little town into horrorville. The chief victim is Toxie, a weakling whose wallow in the waste turns him into a mutant Superhero. Toxie and four other good guys then face off against four bad guys to "fight crime, corruption and chemicals."

I read all about it on the back of a toy package (cardboard and double blister-pack), where I also learned that kids can "slap and slam Bender's head into Fender's head for exciting head-bangin' action!"

One could say that Playmates Toys Inc., the maker of the Toxic Crusaders, has arrived at environmental consciousness. The word is out: Toxics are

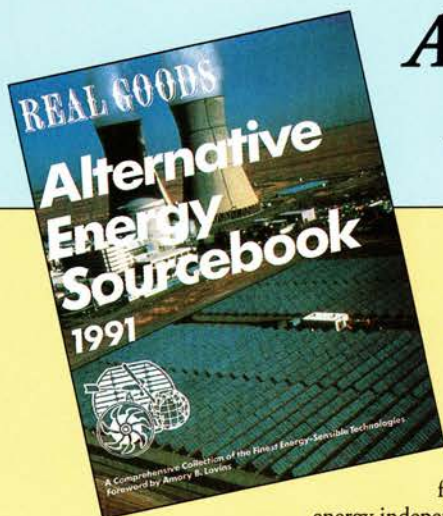
bad. And brutal chemical warfare between hideously disfigured fluorescent plastic toys can teach kids stewardship of the Earth! Right?

My prolonged search for redeeming value in the Toxic Crusaders and their weapons of mass destruction ("Secret toxic glow-in-the-dark weapon: So radioactive, we've put it under wraps!") yielded nothing.

Okay, so I'm being a wet blanket. I know I shouldn't take this stuff so seriously. But when a product that has nothing to do with environmental *consciousness* uses environmental *consciousness* as a sales tool, it confuses the issue — in this case, for kids. I think that's a crime.

— Hannah Holmes

From the people who wrote the book on Alternative Energy



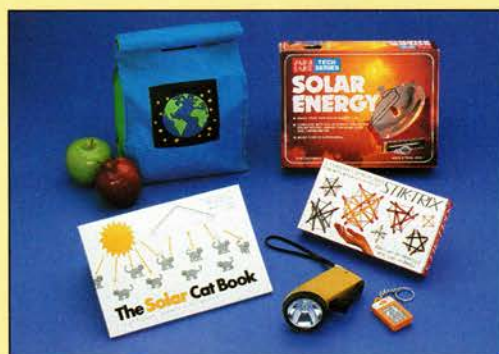
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The inner-city graffiti evangelists who obliterate cigarette ads have apparently been joined by an environment-minded compatriot.

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